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Dissertation

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Disaster resilience and causal linkages between natural disasters and human behavior: A longitudinal case study with victims of typhoon Yolanda in Panay, Philippines

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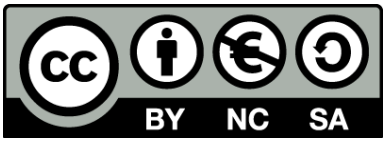
Zusammenfassung in Deutscher Sprache

Die vorliegende Dissertation befasst sich mit der Frage, wie vergangene Naturkatastrophen Verhalten in der längeren Frist verändern können und welche Arten von Charakteristiken von Individuen zu Resilienz gegen Naturkatastrophen beitragen. Um diese Fragen zu beantworten werden Daten von Filippinischen Küstenbewohnern herangezogen, welche ein Jahr vor (2012)-, und drei Jahre nach (2016) einem verheerenden Taifun (Yolanda/Haiyan, geschehen 2013) erhoben wurden. Etwa die Hälfte der 1156 Personen die in diesem Datensatz erscheinen wurde verhältnismäßig stark vom Taifun betroffen, während die andere Hälfte weitestgehend verschont blieb. Durch Bemühungen in 2016 gelang es, 446 Personen der ursprünglichen Studie von 2012 wiederzufinden und Nachfolgestudien mit Ihnen durchzuführen. Da in beiden Jahren der Datenerhebung jeweils 810 Personen befragt wurden, stehen dieser Studie ein balanciertes Panel von 446 Personen, und ein unausbalanciertes Panel von 1156 Personen zur Verfügung.

Für die Datenerhebung kamen ökonomische Experimente zum Einsatz, welche unter anderem Solidarität und Risikopräferenzen von Individuen messen, sowie Surveys, "Participatory Rural Appraisal Tools" und Interviews mit Schlüsselpersonen. Durch das einem natürlichen Experiment sehr ähnlichem Setting ist diese Studie in der Lage, die kausalen Zusammenhänge, die zwischen den Kräften eines verheerenden Ereignisses und Veränderungen im Verhalten von Menschen bestehen, näher zu beleuchten. Weiterhin wird der Zusammenhang zwischen der Ausstattung mit verschiedenen Formen von Kapital (Humankapital, sozialem Kapital, und finanziellem Kapital) und der Effizienz von Erhohlungsprozessen nach der Katastrophe untersucht.

Die Auswertung der Daten ergibt, dass ein Indikator für finanzielles Kapital im negtiven Zusammenhang steht mit der Zeit die für Reperaturen eines Hauses benötigt werden, während Indikatoren für soziales und humanem Kapital keine ausreichende Erklärungskraft zeigen. Allerdings kann bei näherer Betrachtung festgestellt werden, dass die Menge an nahen Freunden bestimmend war für kürzere Reperaturzeiten, und das mit ähnlicher Effektgröße wie ein Indikator für finanzielles Kapital. Ebenso wurde festgestellt, dass besonders arme Haushalte, welche in vergangen Tagen auf Essensrationen verzichten mussten wegen mangelnder finanzieller mittel, substanziell mehr Zeit benötigten, um ihre Häuser zu reparieren. Kausale Zusammenhänge zwischen der Exponiertheit zu einem Taifun und Veränderungen in experimentell gemessener Solidarität oder Risikopräferenzen konnten nicht festgestellt werden.



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The work on a thesis of such extent cannot be possibly made alone and thereby I want to use the opportunity to thank everybody who made the publication of this research possible.

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Of course I also want to thank my second supervisor, Bernd Hayo for always proving to me that he quickly and professionally responds to requests. His sharp eye for detail and his great attribute to speak his brilliant mind freely was of great help to find caveats in this study, but also taught me a lesson or two on what a great - not only scientific - character is made of.

Andreas Landmann, and Adam Douglas Henry also greatly took part in this study and were always of great help. I hope their outstanding minds will keep on contributing to the scientific community for a very long time, since every doctoral candidate can only be happy to have such valuable partners to have a share in their projects.

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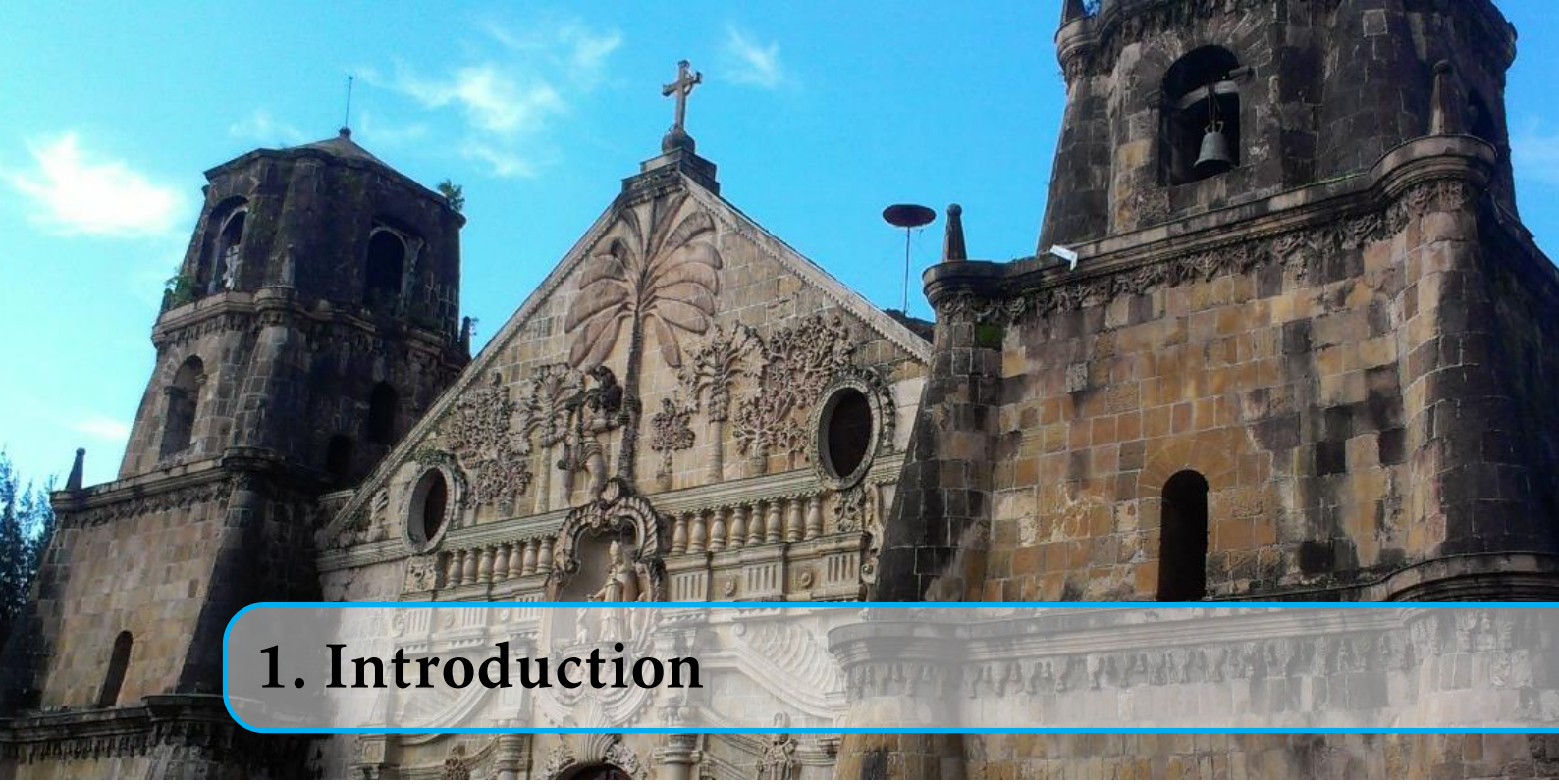
Abstract

This thesis investigates channels to improve individual/household disaster resilience and the causal relation between disaster exposure and changes in capital endowment, social preferences and risk preferences. We use longitudinal data of Philippine coastal villagers from the island Panay which consists of two waves of observation. The first wave was conducted one year before, the second wave three years after one of the most devastating typhoons which ever occurred since meteorological recordings: typhoon Haiyan (locally known as Yolanda). Our data-set includes observations of 1156 individuals, whereat 449 of which are represented in both waves of observation and about half of our observed part of the population was strongly affected by the typhoon, while the other half was rather mildly affected, or not affected at all. We conducted a variety of methods in both years, including incentivized experimental games such as the solidarity game and risk tasks, as well as key informant interviews and focus group discussions including participatory rural appraisal tools in the second wave of observation. We use the collected data to identify channels which contributed most to an effective disaster recovery process, as well as causal relations between disaster exposure and development of human, social, and financial capital and development in risk- and social preferences. The results of this thesis show that investments in households financial capital may be most promising to foster faster disaster recovery compared to other forms of capital, such as social and human capital. We find no causal relation between disaster exposure and behavior in incentivized risk- and social preference tasks, contrary to studies which mostly have only cross sectional data at hand. Therefore this study makes important implications for decision makers involved in disaster risk reduction, by providing further understanding of what possible key determinants of households disaster resilience are, and how capital endowment and aspects of human behavior change over time as a consequence to a typhoon. The results of this study are furthermore highly relevant for the Philippine population, since reports from the latest IPCC imply that the nation may have to face increasing numbers in severe typhoons in the future.



1. Introduction

What makes individuals resilient against disasters? And how do disasters change the way people interact with each other? These questions seem more and more relevant in a world that is confronted with alarming mean temperature changes in its climate which are associated with increases in natural disasters across the globe, be it droughts, floods, storms or else (Mirza, 2002; Adger and Brooks, 2003; Van Aalst, 2006; Li et al., 2009). Understanding the elements that protect systems or individuals from harm to disasters is crucial to develop strategies which foster sustainable development with regard to a radically changing environment. However, the fundamental elements which help socio-ecological systems to adapt and to cope with changes are not quite sufficiently understood, such that there still exist quite a lack in know how on how to adapt and where to invest resources most effectively to foster disaster resilience and hence ensure sustainable development. Common strategies to cope with natural disaster vulnerability vary substantially between global communities and recommendations for the adaption of techniques vary between fields of study which have independently developed as a response to increasing demand to learn more about disaster resilience (c.f. Thomalla et al., 2006). This study seeks to improve our understanding of drivers of disaster resilience, and to shed some light on how disasters shape the behavior of human beings that are affected by them.

Disaster risk reduction has become quite a substantial topic in the international field, partly as a consequence of the United Nations formulating the Sustainable

Development Goals, which follow the Millennium Development Goals from 1990, and acknowledging the link between disaster resilience and sustainable development (United Nations, 2019). As a response to the understanding of the linkage between disaster resilience and sustainable development, the United Nations introduced a separate branch in order to improve disaster risk management across the globe in 1999, the United Nations Office for Disaster Risk Reduction (UNDRR) (UN Office for Disaster Risk Reduction, 2019). This is only one of many examples for the global community realizing the need to learn how to respond to disasters.

When we look at the global community we can observe that not all regions are uniformly affected by natural disasters and some regions are especially challenged by extreme events. In developing countries, most of the population lives from the land and its resources that are imbedded in it, leading to a high dependency of a sustainable functioning of those systems. When this functioning is perpetually threatened by disasters, we begin to understand the linkage between sustainable development and functioning ecosystem services, and therefore global warming and related increases in natural disasters are understood as a global challenge for sustainable development (Todaro and Smith, 2009). Understanding disaster resilience as well as understanding long term consequences of disasters on different aspects of human life have quickly become the center of attention of many scientists from various fields, motivated by the prominently propagated need to find answers for the global community to be prepared against a globally changing environment and its respective resulting changes in living conditions of the global community. Recent exceptionally devastating disasters like the Indian Ocean earthquake and following tsunami in 2004, Hurricane Katrina in 2005, and the Japan earthquake and tsunami in 2011 which was followed by a nuclear disaster surrounding Fukushima have reminded us that sometimes we have to face tremendous destructive forces which severely affect our livelihood in ways which lie beyond our control. Following an increasing global need to be better prepared against natural disasters, many studies have sought understanding of what key determinants of resilience are and how disasters will change our livelihood in the future (see chapter 2). As a result, the importance of strengthening resilience across the globe against natural disasters and a rapidly changing environment is prominently recognized in the 2030 Agenda on Sustainable Development, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction and hence the United Nations Organization calls for responsible corporate adaptation (UN Office for Disaster Risk Reduction, 2019).

Extreme natural disasters are exogenous and sometimes unforeseeable shocks that

heavily affect the livelihood of the exposed part of a population. Such events are very often accompanied by destruction of homes and critical infrastructure and sometimes come along with the breakdown of basic goods provision within a nation, such that external aid is needed to satisfy the needs of the victims. Especially low income regions that are repeatedly exposed to extreme natural disasters need to know more about where to allocate their resources most effectively, since their financial possibilities are sometimes very limited. Hence low income countries are commonly known to be very vulnerable to natural disasters. For example, a study by Strömberg (2007) shows that at the same rate of disaster exposure, mortality risk for low income countries is much higher than the mortality risk in high income countries, which underlines the need for better adaptation strategies in low income countries.

This study investigates what the most effective asset could be to invest in to increase disaster resilience and shows how different forms of capital, pro-social behavior and risk attitudes may change due to natural disasters. I am using panel data from 1156 Philippine coastal villagers which was taken two years before, and three years after a major natural disaster: typhoon Yolanda (Haiyan). I investigate what factors helped individuals to avoid or cope with damages that were caused by typhoon Yolanda and also investigate, how the minimum distance to the eye of the storm (measured by using GPS-data) correlates with changes in capital forms, pro-social and risky behavior over time. I exploit a natural experimental setting in which about half of our participants in surveys and experimental games from 2012 were hit by one of the most destructive typhoons which ever occurred and therefore am able to exclude the possibility of severe biases which usually arise in this kind of studies, that normally have cross sectional data at hand only. Hence we can take a detailed look at how characteristics of the balanced part (449 individuals) and unbalanced part of the panel changed over time with respect to exposure to the natural disaster and have a profound look at what kind of characteristics from 2012 were responsible for a more effective disaster recovery process.

The results of this study can be summarized as follows: They suggest that investments in households social capital might not be generally effective, but rather investments in households financial capital, since we observe that especially households which were better endowed financially before the storm had faster recovery rates than other households, while most social capital indicators failed to be able to explain variation in recovery time. We do find however, that individuals with larger network sizes needed less time to recover with about the same effect size of

a financial capital index. Additionally we reach the same conclusion as previous studies that social capital in general is able to increase help from others in times of need, especially from outside actors such as governmental and non-governmental organizations, whereas trust in friends and family seems to play a special role to receive help from friends, neighbors and family. Financial capital indicators were also quite well explaining help from external and internal agents, and in the case of internal help even more than social capital indicators. Quite contrary, we find that individuals with larger networks perceive less help from friends and family after a disaster which I interpret as a hint towards the potential for too large networks to result in disappointment when larger parts of ones network are expected to help, but do not do so in an emergency situation. However, probably the main finding of this thesis is that most of our presumed connections between forms of capital and disaster resilience have to be rejected when tested in a sufficient empirical setting. Therefore we need further investigation in what the most promising channels for disaster resilience are, what channels are most promising to build adaptive capacity, and how the underlying mechanisms of resilience of social ecologic systems (SES) really work.

When we look at the question how disasters change human behavior, we cannot reject the hypothesis that the events following a disaster increase general trust of individuals who shared the same fate. But we find that this is not true for all kinds of social preferences, since we do not find a relation between disaster exposure and experimentally measured solidarity, trust towards institutions, or other parts of social capital measures from this study. We find a possible negative long term relation between disaster exposure and human capital in general, and especially conscientiousness, which means that natural disasters might have negative long term consequences on the way individuals function on the labor market. Furthermore we find no causal relation between long term changes in risk aversion and disaster exposure, contrary to similar studies.

The remainder of this thesis is structured as follows: In section 1.1 I elaborate more on the motivation behind this study and give more information about the natural disaster we are investigating in this study: typhoon Yolanda (Haiyan). In chapter 2 I discuss a framework which was developed together with my supervisors and external consultants and which shows the relevant channels that lead adaptive capacities of individuals within SES to transform due to natural disasters. Furthermore chapter 2 elaborates more on the research question and hypotheses of this thesis. Chapter 3 explains the methods that are used in this study in detail and provides the reader with information necessary to be able to reproduce this

study in the same or a different context. Chapter 4 describes the data set and gives first insights into socio-demographics of our sample and provides also further understanding of how intensely affected individuals were due to typhoon Yolanda, how individuals prepared and responded, how the disaster relief process was perceived, and how key determinants of resilience developed over time. Chapter 5 then investigates the relation between suspect key determinants of disaster resilience and the recovery time, recovery costs and further indicators for disaster resilience of the households in our sample, and the relation between disaster exposure and changes in capital, pro-social and risky behavior. The thesis is concluded by chapter 6 which discusses probable weak points of this study and the methods at hand, give a summary of main results and close the thesis with concluding remarks.

1.1 Motivation

According to the International Panel on Climate Change (IPCC),

> *Adaptation can contribute to the well-being of populations, the security of assets and the maintenance of ecosystem goods, functions and services now and in the future. Adaptation is place- and context-specific. A first step towards adaptation to future climate change is reducing vulnerability and exposure to present climate variability. Integration of adaptation into planning, including policy design, and decision-making can promote synergies with development and disaster risk reduction. Building adaptive capacity is crucial for effective selection and implementation of adaptation options. (Pachauri et al., 2014, p.19)*

Hence in a world where the global climate is changing due to anthropogenic climate change and resulting increases in natural disasters such as floods, droughts or tropical storms, it becomes more and more important to understand what role natural disasters play in human livelihood, and therefore the need to understand what can foster disaster resilience and adaptation becomes more and more relevant as global mean temperatures rise. While there is low confidence that the frequency of global cyclone activity is linked to rising sea surface temperatures (Pachauri et al., 2014), a study by Emanuel (2005) predicts that not necessarily the frequency, but the destructiveness of hurricanes may become more severe as global sea surface temperatures rise. Another study by Webster et al. (2005) shows that cyclone intensity has in fact increased over the last 30 years, while the number of

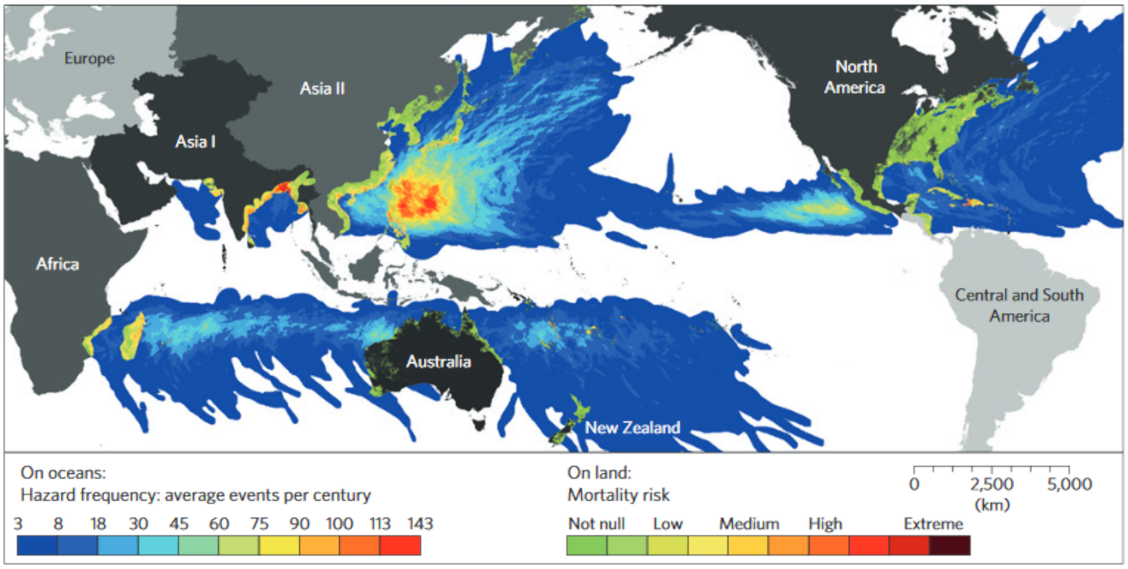


Figure 1.1: Map showing distribution of hazard frequency and mortality risk from tropical cyclones for the year 2010. ((taken from: Peduzzi et al., 2012)

occurrences did not change substantially, with the exception of the North Atlantic during the past decade.

Figure 1.1 taken from Peduzzi et al. (2012) shows the occurrences of tropical cyclones per century and on land mortality risk for the Pacific and Indian Ocean. It does not take a very long look to realize that especially the northern Philippines, Taiwan and southern Japan are most frequently exposed to tropical cyclones. We can therefore conclude that, if the predictions by the IPCC studies (Emanuel, 2005; Webster et al., 2005) come true, especially these regions will be extraordinarily influenced by increasing cyclone intensity. Hence the need to develop strategies to cope with these disasters becomes even more apparent. Therefore, if mean sea surface temperatures keep rising, it seems to be very likely that regions which are situated in high risk areas have to come up with ideas on how to deal with the future prospect of more frequently occurring relatively strong tropical storms to adapt to those radical changes. But not only understanding the connection between tropical cyclones and global warming is relevant for the global community today, also the rapid changes SES are foregoing in general in the next few years as a consequence of climate change will greatly influence the livelihood of countless people. However, low income countries are especially vulnerable to the changes since developing countries mostly do not have strong capacities to mitigate the effects of a drastically changing environment. Usually, individuals from low income countries rely on their social networks and external aid providers for help after an extreme natural disaster, since other channels that have the potential to

provide disaster relief are mostly not sufficiently developed (c.f. Cox and Jimenez, 1998; Fafchamps and Lund, 2003; Fafchamps and Gubert, 2007; Barameda and Barameda, 2011). So far we have learned that the probability of tropical cyclones reaching higher intensity levels is linked to rising sea surface temperatures, and that countries in Southeast Asia are especially exposed to tropical storms. In addition to that, the IPCC reports that mean sea surface temperatures have risen substantially in the last century, meaning that also the number of extremely intense tropical cyclones is likely to increase in the future, should the trend in rising temperatures continue, which it most likely will. Figure 1.2 shows the development of land and sea surface temperatures across the globe (parts (a) and (b)), as well as the development of global sea level and precipitation over the last decade. As we can see from the figure, sea surface temperatures (SST) have increased since 1901 in Southeast Asia between 0.6-1.25 degrees Celsius on average and the trend seems to be consistently going upwards since 1850. Hence it becomes necessary to talk abut the consequences for countries and respective communities which are located in areas that are especially prone to natural disasters such as tropical cyclones, since the probability of exposure to extremely strong events is likely to increase in the future.

Although disasters cause destruction and have severe impacts on the livelihood of individuals, from an economic perspective the discussion seems not finished if extreme events have negative or positive overall consequences on economic output and development. A study by Felbermayr and Gröschl (2014) for example uses GeoMet data and shows a substantial negative and robust average effect of disasters on growth. The average effects they find are supposedly driven by very large earthquakes and only some meteorological disasters. Poor countries are more affected by geophysical disasters, while rich countries tend to be more affected by meteorological disasters. Additionally they find that international openness and democratic institutions reduce the adverse effects of disasters. A milder view on the effects of natural disasters on economic output was provided by Cavallo et al. (2013). They look at panel data and investigate the causal relation between exposure to natural disasters and economic growth on an international level. Their findings suggest that only extremely intense natural disasters have the potential to significantly influence economic growth. However, this seems to be true only for natural disasters that were followed by radical political revolutions. Skidmore and Toya (2002) conduct an empirical cross sectional analysis by looking at the correlation between the occurrence of natural disasters and economic growth rates. Their findings suggest that there are diverse effects of different

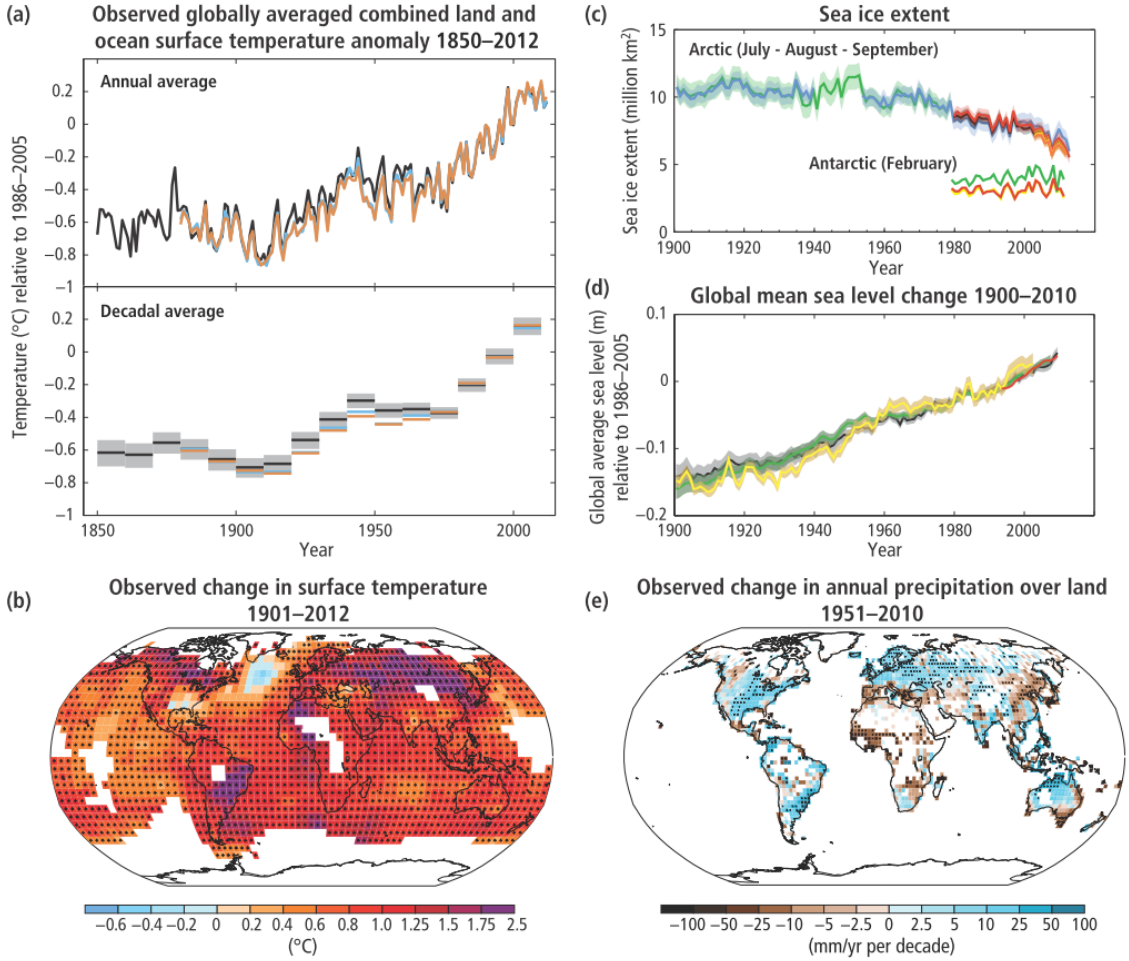


Figure 1.2: Figures representing global changes in surface temperatures, sea levels, sea ice extend, and precipitation rates taken directly from Pachauri et al. (2014); part (a): land and ocean surface temperature anomalies between 1850-2012; part (b): change in surface temperatures between 1901-2012; part (c): sea ice extend since 1900; part (d): mean sea level change between 1900-2010; part (e): changes in precipitation over land between 1951-2010

types of disasters as they find a positive correlation between climatic disasters and economic growth, human capital investment and total factor productivity, whereas geological disasters are negatively correlated with growth. In an analysis of global data implementing all documented occurrences of tropical cyclones from 1950-2008, Hsiang and Narita (2012), find that countries more frequently exposed to tropical cyclones have marginally declining numbers of deaths and damages, implying that adaptation over time does indeed take place. However the authors conclude that this effect seems to be rather small since only about 3% of damages are "adapted away" by adaptation processes. Toya and Skidmore (2007) take a look at macro data on the international level and correlate economic output per capita, years of schooling, and other variables with the number of deaths and damages that are caused by disasters. They find that countries with higher income, higher educational attainment, greater openness, more complete financial systems and smaller government experience fewer losses in terms of deaths.

As unclear as the economic consequences of disasters are, so are the effectiveness of determinants of disaster resilience. While the concept of community disaster resilience in the context of SES has been investigated and discussed thoroughly (Mayunga, 2007; Norris et al., 2008), there is still a lack in knowledge on where investments are most likely to be most effective to foster disaster recovery processes. This gap in the literature is also made apparent by Norris et al. (2008) when the authors state at the end of their extensive review on the term resilience:

> *Our primary hope is to foster creative thinking about how various pathways between Economic Development, Social Capital, Information and Communication, and Community Competence shape disaster readiness and recovery: Which of these resources are most likely to be robust, meaning they are strong and able to withstand the impact of a major disaster? Which may be substitutable for others, thereby building redundancy? ... but no study, to our knowledge, has examined how independently assessed community resources influence the post disaster wellness of constituent populations. (Norris et al., 2008, p. 144)*

This study aims to close this gap by investigating the correlation between certain pre-disaster capacities and disaster recovery indicators. Due to this analysis we hopefully gain insight into the matter where investments in adaptive capacity building might be most effective to increase disaster resilience.

In addition to that strand of literature it also seems beneficial to investigate how adaptive capacities may change due to disaster exposure, and if there are dynamics

which we should be especially aware about. While it has been generally accepted in the literature that different forms of capacities, or capital, are substantial contributors to disaster resilience (Mayunga, 2007; Gunderson, 2010), the matter of how these capacities or forms of capital change on the micro level due to disaster exposure has not been extensively studied in an empirical setting to my best knowledge. At the time of writing this thesis, I am only aware of one study by Yamamura (2016) who investigate the impact of an earthquake on changes in aspects of social capital.

Besides to the field of disaster resilience, this study also contributes to a strand of literature that investigated the endogeneity of preferences (Bowles, 1998) in the context of natural disasters. As foreseeing natural disasters in the long term is practically impossible today, studies which are closely related to experimental economics which investigate diverse effects of natural disasters on human behavior and preferences mostly compare cross sections of individuals and their respective behavior in incentivized games and therefore have to rely on many assumptions which are associated to those kinds of studies which are not taking place in a completely controlled environment (see section 2.4). The nature of our data greatly contributes in that regard since this it is (to my best knowledge) the first study which integrates experimentally measured incentivized risk and social preferences into a longitudinal study design which uses disaster exposure as exogenous variation.

1.2 Research site

Our study takes place on the islands of Panay and Guimaras, which are located in the Western Visayas (Region VI) in the Philippines. The island of Panay constitutes an area of roughly 12,300 square kilometers, has a diameter of roughly 130 kilometers and is home to about 3,420,000 inhabitants. It is devided into four provinces: Aklan, Capiz, Antique and Iloilo. Our study takes place in two of these provinces: Antique and Iloilo, which cover roughly four fifths of Panays coastline. We strictly conducted our study with coastal villagers since the first wave of two waves of observations was designed to derive effects of marine protected areas on social cohesion within communities (for details see section 3.1). Panay has three larger cities: Iloilo, Kalibo and Roxas which provide homes for roughly 2.2 million people. The main economic activity on Panay is primary sector production of agricultural and mining products. Guimaras is a smaller Island to the Southeast of Panay, constitutes an area of roughly 600 square kilometers and is home to about

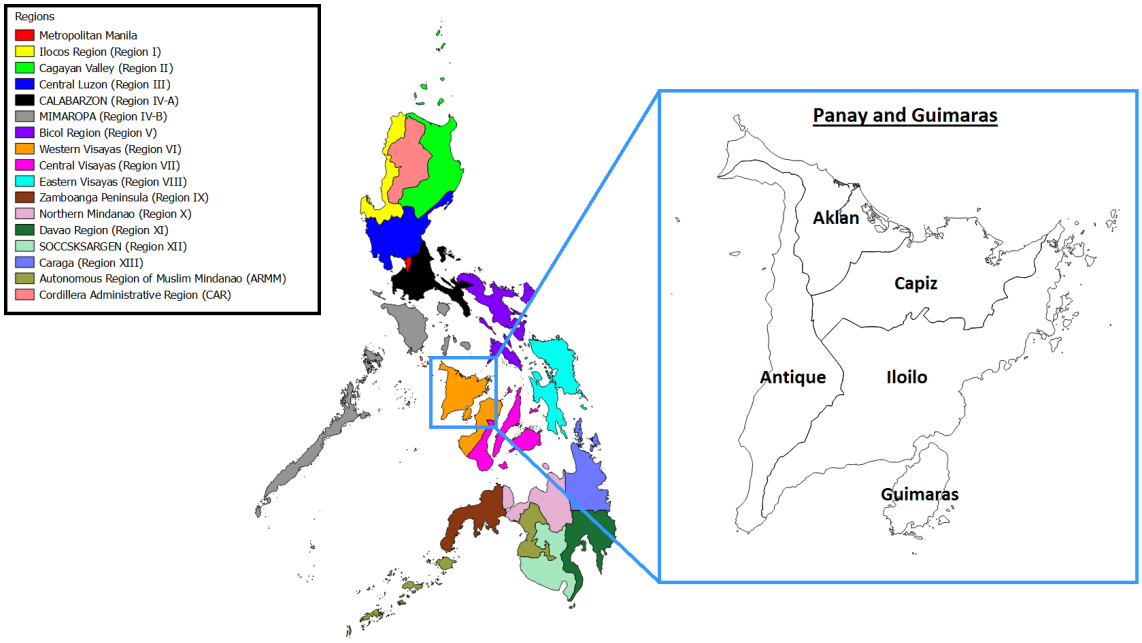


Figure 1.3: Regional division of the Philippines and the provinces of Panay and Guimaras ((data from: PhilGIS, 2017)

175,000 people (Government of the Philippines, 2018).

1.2.1 Natural disasters in the Philippines

The Philippines have a long history with tropical cyclones (and natural disasters in general) and are a region with vast experience with regular tropical storms since the country is located on the Pacific typhoon belt. On average, the Philippines are experiencing 20 typhoons each year, whereas approximately one fourth of which cause damages[1]. Furthermore the country is not only located on the Pacific typhoon belt, but also on the so called Pacific ring of fire, which constitutes that earthquakes and volcanic eruptions are generally not seen as unusual events. Additionally its geographic properties make it especially prone to tsunamis, sea level rise, storm surges, landslides, flooding, and drought (ADRC, 2018). Hence the Philippines rank third in a list of countries which are exposed most to natural disasters and are viewed as one of the most vulnerable areas in Asia (Garschagen et al., 2016).

The country is frequently exposed to numerous disasters. The data set EM-DAT provided by the Center for Research on the Epidemiology of Disasters (CRED) (Guha-Sapir et al., 2015) provides a decent overview about the frequency and other indicators of more severe natural disasters, since only disasters are captured

[1] Corporal-Lodangco and Leslie (2017) report slightly lower numbers between 1945 and 2011, namely an average of 17 annual typhoon whereas 7 of which make landfall.

in this database where either: a) ten or more people were reported killed; b) one hundred or more people were reported affected; c) a declaration of a state of emergency was made; or d) a call for international assistance has been executed. I use this data set to look at the number of different disasters that fall in at least one of those previously mentioned categories and to show the cumulative number of events and associated number of affected people, deaths, and economic damages (see Table 1.1). Therefore we can get a feeling about how important the topic of natural disasters is in the Philippines. We can clearly see that tropical storms contribute the most to disaster exposure, with average annual occurrences of about three incidents. These three incidents per year cause an average yearly damage of about US$180 million and approximately affect 1.4 million individuals, and these are only the storms that fall into one of the four categories to even be listed in the EM-DAT data base.

But destruction alone is not the only politically relevant topic, also displacement and migration due to disasters play a certain role in developing strategies to conquer the aftermath of such events. According to World Bank data (The World Bank, 2018) the Philippines were confronted with an average of 3.7 million people per year which were displaced because of disasters between 2009 and 2017. This number peaked in the year of typhoon Yolanda (2013) with about 7 million recorded displaced individuals.

Table 1.1: Occurrences of natural disasters in the Phillippines since 1900 according to Guha-Sapir et al. (2015)

	# (⌀ per year)	totally affected population (⌀ per year)	deaths (⌀ per year)	associated damages (in million US$) (⌀ per year)
earthquake	32	5,857,237	9,975	603.52
	(0.27)	(49,637)	(85)	(5.11)
epidemic	18	149,422	1,283	n.a.
	(0.15)	(1,266)	(11)	(n.a.)
flood	150	33,510,034	3,668	3,811.36
	(1.27)	(283,983)	(31)	(32.30)
landslide	30	317,546	2,441	33.28
	(0.25)	(2,691)	(21)	(0.28)
storm	349	165,259,751	49,221	21,511.79
	(2.96)	(1,400,506)	(417)	(182.30)
volcanic eruption	27	1,881,508	2,996	235.53
	(0.23)	(15,945)	(25)	(2.00)
total:	606	206,975,498	69,584	26,195.47
	(5.14)	(1,754,030)	(590)	(222.00)

Looking at child mortality, a study by Anttila-Hughes and Hsiang (2013) finds that especially female children in the Philippines are likely to be severely disadvantaged by the lack of income and resources after a natural disaster, whereas especially female children in households with older brothers significantly are more likely to die in the aftermath of a disaster. Generally they find that unearned

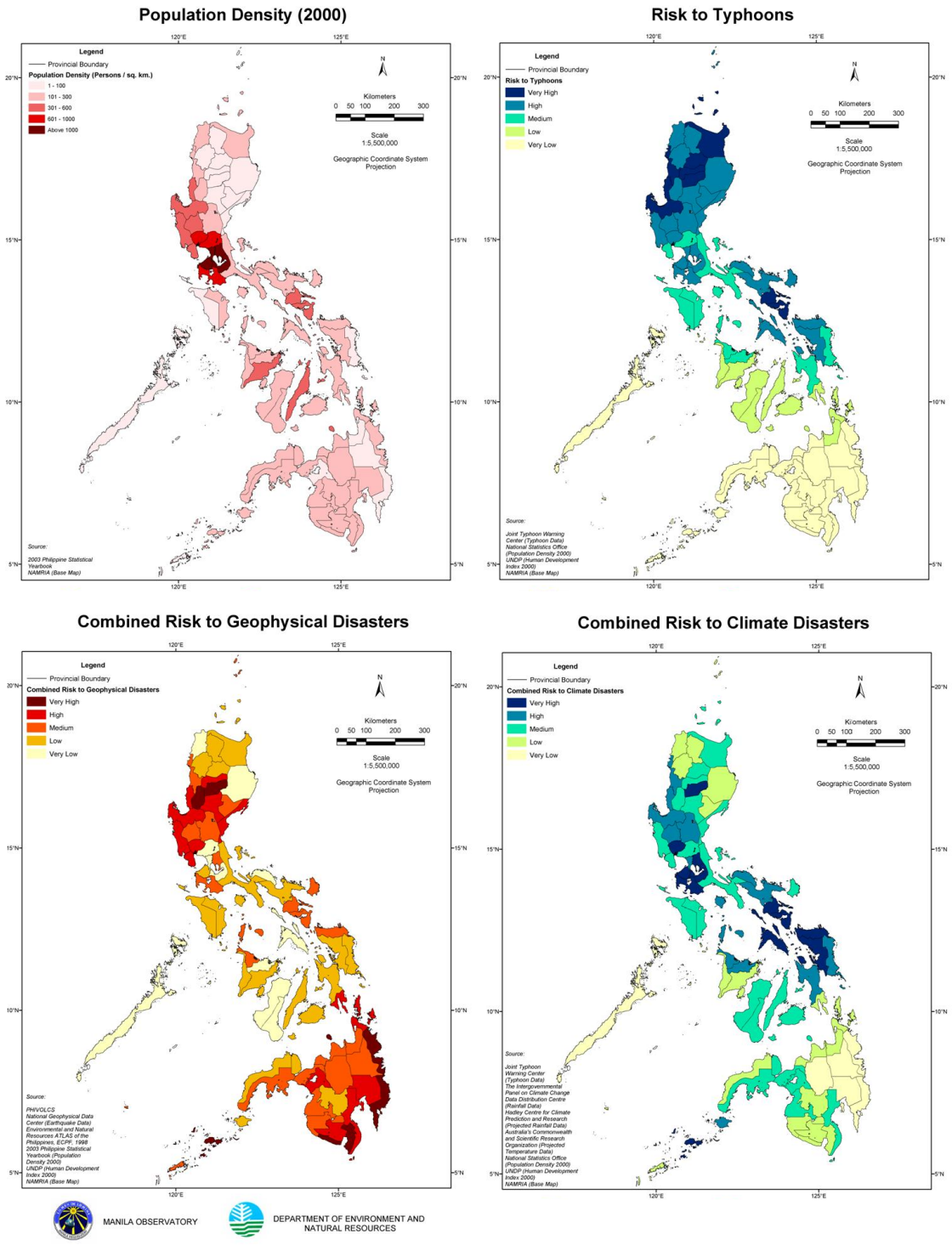


Figure 1.4: Maps showing the provinces at risk of natural disasters in the Philippines (taken from: Manila Observatory (2005))

income and excess infant mortality outweigh the direct damages and deaths associated with disaster exposure by a factor of fifteen.

The Manila Observatory (2005) constructed risk maps to visualize the Provinces that are highly vulnerable and frequently exposed to different sorts of natural disasters. We can clearly see from Figure 1.4 that the areas that are in high risk of experiencing damages from typhoons are mainly situated in the northern parts of the Philippines, including the densely populated Metro Manila area, whereas it is rather unlikely for the southern parts to suffer damages from typhoons. The map on combined risk to geophysical disasters shows aggregated information on the risk to suffer damages from earthquakes, earthquake-induced landslides, tsunamis and volcanic eruptions. We see that especially the North and the South are more likely to suffer from such geophysical extreme events than the central parts. The same relations seem to be true for the aggregated map on risk to suffer from climate disasters, such as typhoons, temperature increases, changes in rainfall, or to droughts that are caused by El-Niño. Again we see that the North, East and also some southern parts of the Philippines are relatively more prone to disaster risk than the central parts. As we can see, the area of our study where typhoon Haiyan happened (more on Haiyan and our study site in subsection 1.2.2), namely the Provinces of Antique, Iloilo and Guimaras, are generally considered as low risk areas where the event of a natural disaster is relatively unlikely. However, to be fair, at the time we were conducting our study (between July and October 2016), we experienced two minor typhoons and one minor earthquake directly in that area. Hence low risk should not be confused with no risk at all.

A study by Corporal-Lodangco and Leslie (2017) gives a climatological summary about tropical typhoon activity in the Philippines by looking at tropical cyclone data between 1945-2011. Their analysis shows that there is a clearly observable more active season (MAS) which usually ranges from June-December with one or more cyclones per month on average, whereas the cyclones are typically stronger and more severe in the MAS and less so in the less active season (LAS) between January and May (see Figure 1.5).

1.2.2 Haiyan ("Yolanda")

Typhoon Haiyan, or locally known as Yolanda, was one of the most devastating super typhoons since climatological recordings and is ranked as the second most deadliest typhoon which happened in the Philippines right after typhoon Haiphong, which happened in 1881 (University of Rhode Island, 2018). Until today, Yolanda is the second strongest typhoon that ever happened since modern

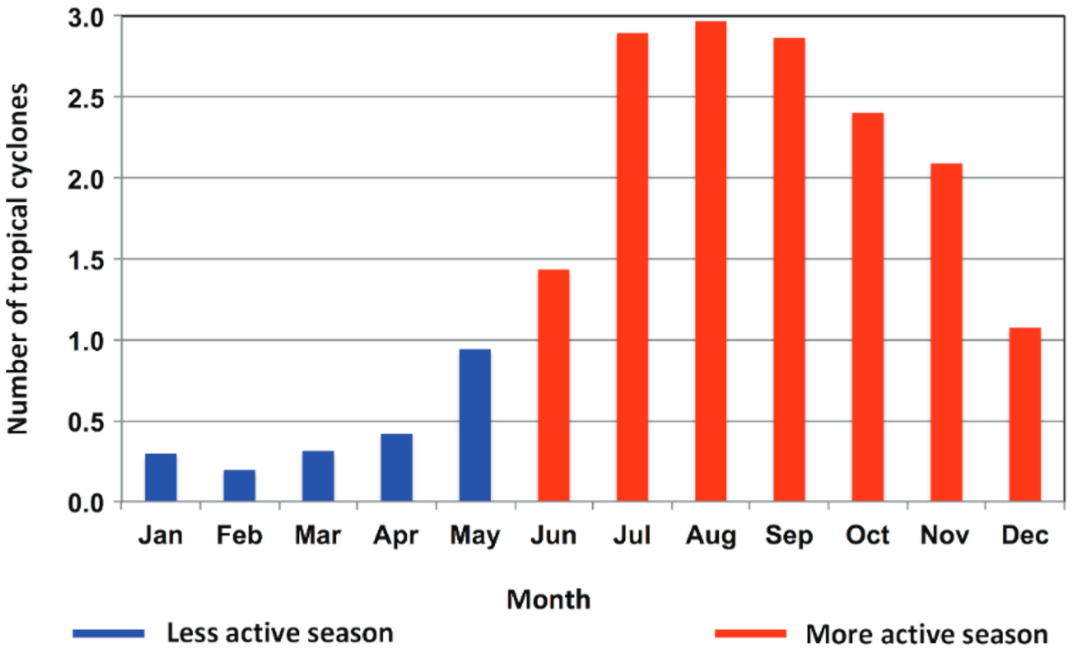


Figure 1.5: Annual tropical cyclones in the Philippines (taken from: (Corporal-Lodangco and Leslie, 2017))

meteorologic recordings, only surpassed by typhoon Tip which occurred in 1979 (Kitamoto, 2018). However, Yolanda's track led through very densely populated areas and ended up to be the most destructive typhoon that ever occurred in the Philippines (Lum and Margesson, 2014; Daniell et al., 2013). Starting as a tropical depression on November 2nd, the typhoon first made landfall on Eastern Samar on November 8th as a full grown super typhoon with maximum mean wind speeds up to 235kmh, whereas the storm gusts could reach up to 380kmh, making it a class 5 super typhoon on the Saffir-Simpson Hurricane Wind Scale (Simpson and Saffir, 1974). Cyclones of such strength usually cause immense structural damage and can isolate communities for longer periods by destroying critical infrastructure, like sources of power supply and power supply lines or transportation infrastructure. Especially island communities may find it hard to have access to food and water as some of our interviewees reported. Several individuals from the municipality Conception (part of our study site) which we interviewed reported a complete cutoff from the main land because of the destruction of their boats at sea. Therefore the islands were isolated from usual food and drink supply and were reliant on deliveries by helicopters for several weeks. Because of the immense destruction caused by Yolanda, one of the major challenges in the aftermath was to cope with the immense homelessness of people. One month after

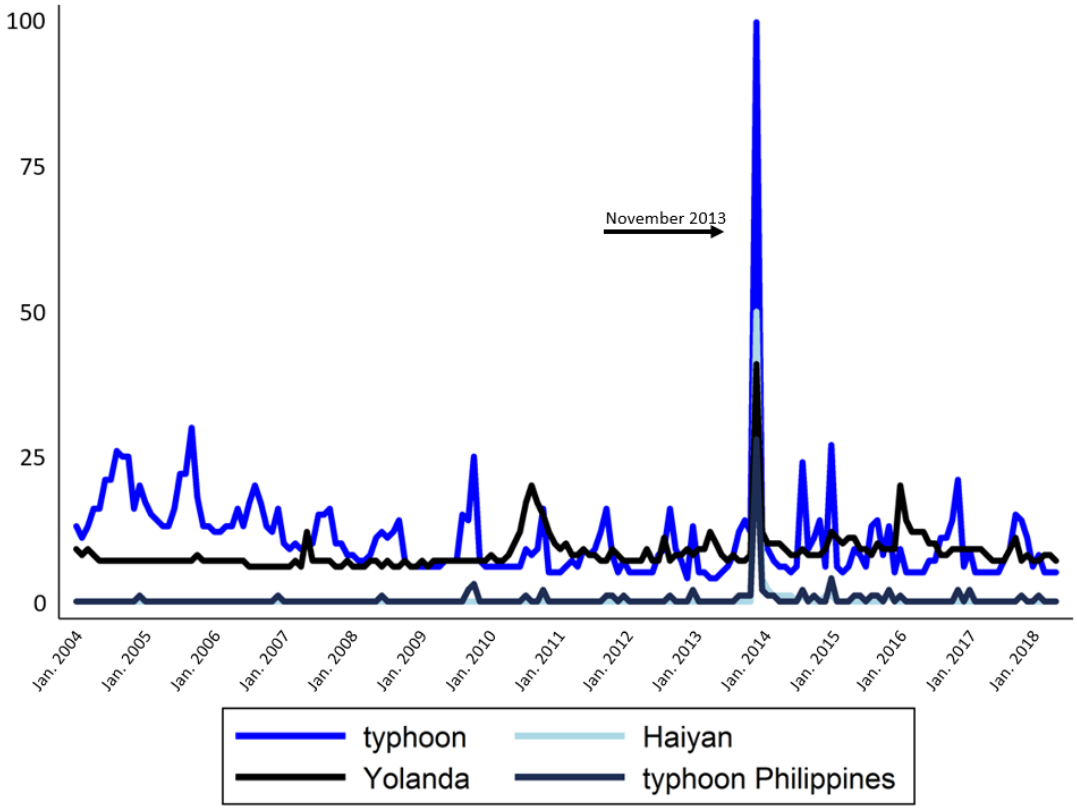


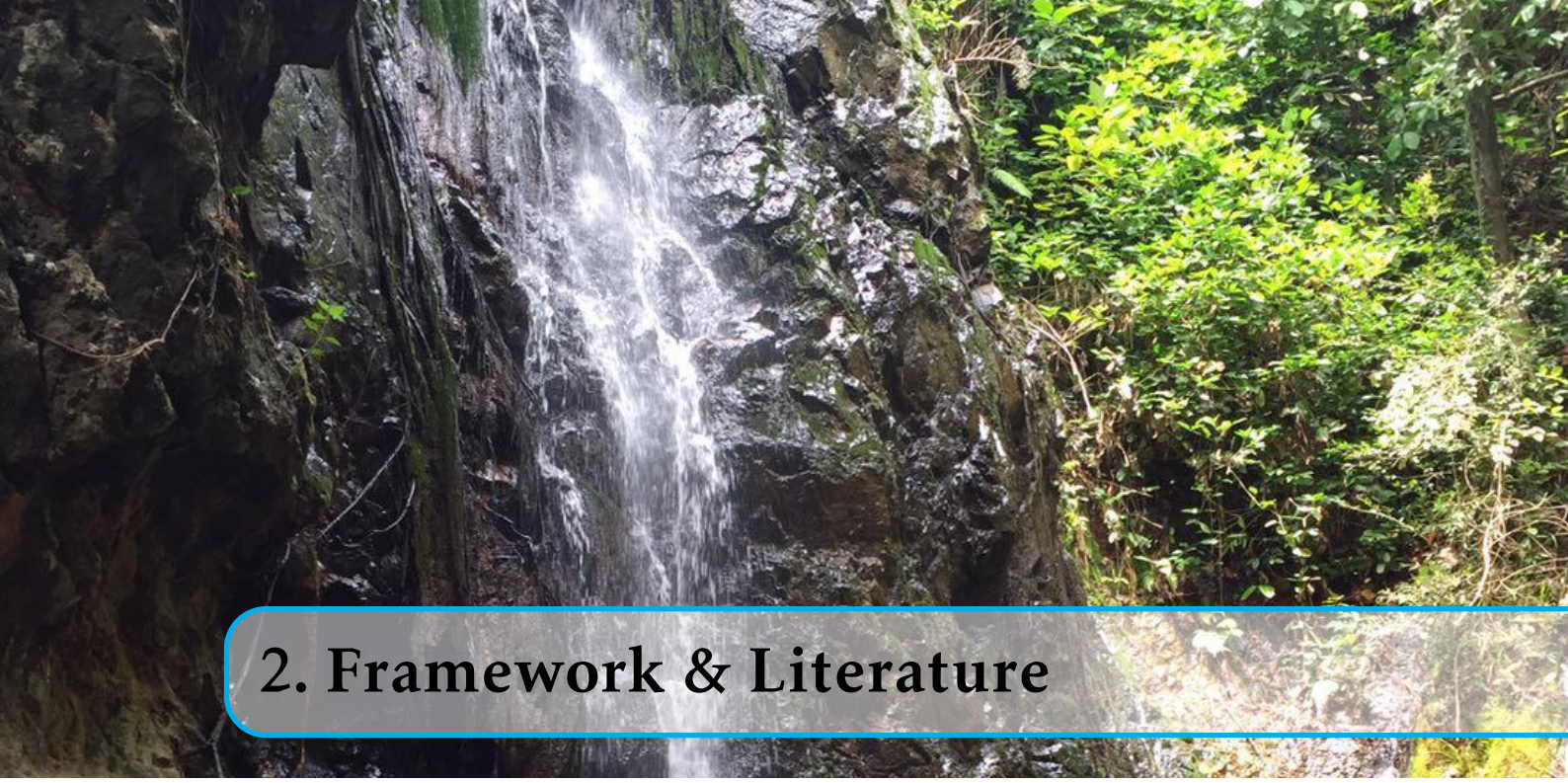
Figure 1.6: Google search queries 2004-2018 (Google Trends, 2018)

the typhoon, 4 million people were still homeless and only about 94,000 were able to find shelter in a local evacuation center (UNICEF, 2014). The destruction and suffering Yolanda caused was manifold. According to official reports, about 16 million people were affected by the typhoon, causing about 29,000 injured people and 6,300 deaths. The number of damaged and destroyed houses reached about 1,140,000, whereas half of which were totally destroyed[2] (NDRRMC, 2013). The National Disaster Risk Reduction Management Council (NDRRMC) of the Philippines estimated the total need of financial funds for recovery to a total sum of US$2.4 billion, whereas about US$1.4 billion were insured losses (Swiss RE, 2014; NDRRMC, 2013).

The international response to Yolanda was quite exceptional. Never before has a typhoon caused such a high degree of international attention and interest. In Figure1.6 we present Google-trends queries from 2004 until 2018 for the words "Yolanda", "Haiyan", "typhoon", and "typhoon Philippines". We can clearly see that the interest in the world wide web regarding this disaster was truly excep-

[2]According to our key informants which we interviewed, "totally" destroyed means a destruction of more than 40% of a structure, whereas "partially" destroyed means a destruction between 20%-40% of structural components.

tional, showing an almost 20 time increase in queries for the word "typhoon" around November 2013. The incidence was also prominently present in mainstream media, like CNN news reports or newspaper articles. According to Global Media Arts Network, a Philippine media company, the top ten donor nations delivered a sum in disaster aid of about 521 million US-dollars, whereas United Nations Organizations provided additional 81 million US-dollars (GMA, 2015). But international emergency aid not only consisted of the help of international governments, the UN, military units, and NGO's, but also of private donors and celebrities. To mention all of them would certainly go beyond the scope of this section. Resourceful and more interested readers can find more about the single donors and supporters in topic related articles and web-pages (e.g. Brolin et al., 2015; GMA, 2015; Wikipedia, 2017; The Guardian, 2017; Center for Disaster Philatropy, 2017; Disasters Emergency Committee, 2018).



2. Framework & Literature

This chapter summarizes the current view of the literature on what key determinants to build disaster resilience are and give an overview of relevant terms. Within this chapter I describe the framework of this study, which was for the most part inspired by the capital based approach offered by Mayunga (2007) to interpret disaster resilience. I begin by giving an overview about the literature discussing the term "resilience" and its associated components, followed by a discussion on the capital based approach. This chapter then concludes by discussing the role of the single components of the capital based approach (human capital, financial capital, social capital, physical capital and natural capital) in the context of disaster resilience and gives examples of empirical literature that investigate respective relations. Following the discussion about the components of disaster resilience I give an overview on the potential effects of natural disasters on the development of adaptive capacities and human social and risk preferences. The chapter concludes by formulating the research questions and respective hypotheses at hand, which I test in the scope of this analysis.

2.1 A discussion about disaster resilience

The term "resilience" is originally a term which is commonly used in physics which describes the ability of a system to return to its initial state after being exposed to some sort of disturbance (Norris et al., 2008). Although scholars have a pretty similar understanding of what disaster resilience is, actual definitions

of disaster resilience differ substantially between fields of research and publications in general, which was shown by Bhamra et al. (2011), who find about 18 different definitions of the term in various studies, and by Mayunga (2007) who finds 19 different definitions between various studies. Nevertheless it has been widely acknowledged that the term was first introduced into the context of SES by Holling (1973), who defines resilience as "The measure of the persistence of systems and of the ability to absorb change and disturbance and still maintain the same relationships between state variables". But since there is such a variety of definitions of resilience and related key terms, I want to take some time to explain and discuss the definitions with which I am working in this thesis.

As a result of uncertainty in the final definition of resilience there has been also a wide range of definitions for terms which are often used in the same context, such as the terms "adaptive capacity", "sensitivity" and "vulnerability". The ongoing debate in disaster literature of what defines disaster resilience and in how far it is distinguished from vulnerability, adaptive capacity, or other, often synonymously used terms, is seemingly not finished and is fundamentally driven by disagreement on how to define the relationship between those underlying key terms (Cutter et al., 2008). This can also be seen in a publication by Murphy (2007), where the author states that there are about 25 different understandings of the key term "vulnerability" in disaster related literature. As a consequence, this ongoing debate about the definition of key terms has led scholars to use those terms almost interchangeably or as polar opposites, which sometimes caused repetitive debates about the definition of resilience, adaptive capacity and vulnerability (Gallopín, 2006).

Although there is no single definition on which researchers have agreed on, one of the most widely accepted understanding of vulnerability is its definition as a function of the sensitivity of a system (the degree to which a system changes due to external influences (Tomović, 1963)) and exposure to a disaster (a function of the likelihood and intensity of a perturbation (Adger, 2006; Kasperson et al., 2012)[1]) (Cutter et al., 2008; Intergovernmental Panel on Climate Change et al., 2014). This definition already has some implications about the understanding of sensitivity. At a first glance the distinction between vulnerability and sensitivity according to this definition seems blurry, but the difference is simply that vulnerability takes the probability of a perturbation into account. Sensitivity on the other hand describes what would happen if some sort of hazard occurs (the degree of destruction). Take an indigenous village in the rainforest and an avalanche

[1] As cited in (Gallopín, 2006)

for example. Of course avalanches are not likely to occur in the rainforest, but still an indigenous village is very *sensitive* to them, because an avalanche *would* cause extreme damage to the village. However, the village is not *vulnerable* to avalanches since their likelihood of occurring in the rainforest is practically zero. This example shows the difference in the understanding of the terms sensitivity and vulnerability, and I am using these interpretations of the terms.

The above definition of vulnerability has also some implications about the understanding of the term "exposure", which is seen as a function of the "... degree, duration, and/or extend in which the system is in contact with, or subject to, the perturbation" (Gallopín, 2006, p.296). Therefore the term "exposure" can be understood as an interaction between the probability of disasters and their respective intensity, which ultimately relates to a continuous time-frame. At this point I would like to exchange the term "exposure" with "hazard potential", since I will later relate the term "exposure" to the actual strength of impact of a single natural disaster, while "hazard potential" better captures the continuous and probabilistic nature of being confronted with certain threats over time.

The term "adaptive capacity" is also often substituted by the terms "coping capacity" or "capacity of response" and generally refers to attributes which allow a system not only to mitigate damages of a potential disturbance, but also to use opportunities and cope with immediate consequences (Gallopín, 2006). The term generally refers to capacities, attributes or features which enhance the ability of a system to respond to changes in a way which allows the system to keep its desired functionality. Therefore it describes everything that helps to improve the ability to adapt to a situation in a way such that the main functions of a system do not fundamentally change in a negative way, or actually improve. Generally there is also a clear distinction between adaptive capacities and adaptness - a well adapted system is not necessarily adaptive (cf. Smit and Wandel, 2006; Walker and Salt, 2012). A system could be well adapted to one state of nature, whereas it might lose its functionality as soon as circumstances change. Therefore, how well a system adapts to a changing environment is defined by its capacity to adapt, and not its adaptness to a specific state of nature. In the literature, the relation between adaptive capacity, resilience, and vulnerability is not well defined (cf. Cutter et al., 2008). It has been common practice in the past to use the term "adaptive capacity" almost interchangeable with the term "resilience" (Adger et al., 2005; Gallopín, 2006; Cutter et al., 2008), but I see adaptive capacity rather as a part of resilience, since the ability of a system to maintain its functionality after a disturbance depends on more than its ability to adapt and hence adaptive capacity

is not the only concept embedded in resilience.

Reading about the relation between terms that are related to disaster resilience is a bit like reading discussions about the hen and the egg - or more like discussions about the question: "Was the egg in the hen first, or the hen in the egg?". This circumstance has been shown quite nicely in an article by Cutter et al. (2010) where the authors graphically show the different understandings of relations between terms across related fields of study. Figure 2.1 shows this graphical representation by Cutter et al. (2010). Parts (A), (B), and (C) of Figure 2.1 show common interpretations that can be found across the global environmental change literature, where resilience may be an integral part of adaptive capacity (part(A)), vulnerability embeds adaptive capacity (part(B)), or adaptive capacity as a subset of resilience, which in turn is a subset of vulnerability (part(C)). In hazards research (parts (D), (E), and (F)), resilience may be a subset of resilience (part (D)), adaptive capacity a subset of resilience (part (E)), or even separate concepts which overlap in some areas (part (F))[2]. Hence at this point I want to integrate the above definitions of resilience, adaptive capacity, vulnerability, sensitivity, hazard potential and capacity of response into a framework which clarifies the relation between the underlying key terms to avoid confusion regarding the interpretation of the meaning of the terms I use in this thesis.

I use an understanding of the relation between aspects of resilience which is similar to the one of Gallopín (2006), which corresponds to an understanding which relates to part (C) of Figure 2.1, whereas I see resilience as the overall concept which integrates aspects of adaptive capacity and vulnerability into one common attribute. Adaptive capacity contains attributes which allow a system to bounce back to - or even improve - its initial functionality after changes in its environment, whereas vulnerability integrates elements which allow a system to predict and react to changes before they are occurring (therefore drawing a clear distinction between capacity of response and adaptive capacity). Capacity of response therefore partly defines how exposed a system is to the forces of a disaster by, for example, implementing mitigation or avoidance mechanisms, which in turn define how sensitive a system is to disturbances. Therefore I see vulnerability as a function of sensitivity (which describes the extend of changes in the environment that occur due to a disaster of certain strength) and hazard potential (which is the probability of a disaster of certain strength). Therefore I am using a definition which is different from the understanding of Gallopín (2006), who provide an extensive review on the understanding of the underlying

[2]For citations see Cutter et al. (2010, p. 600).

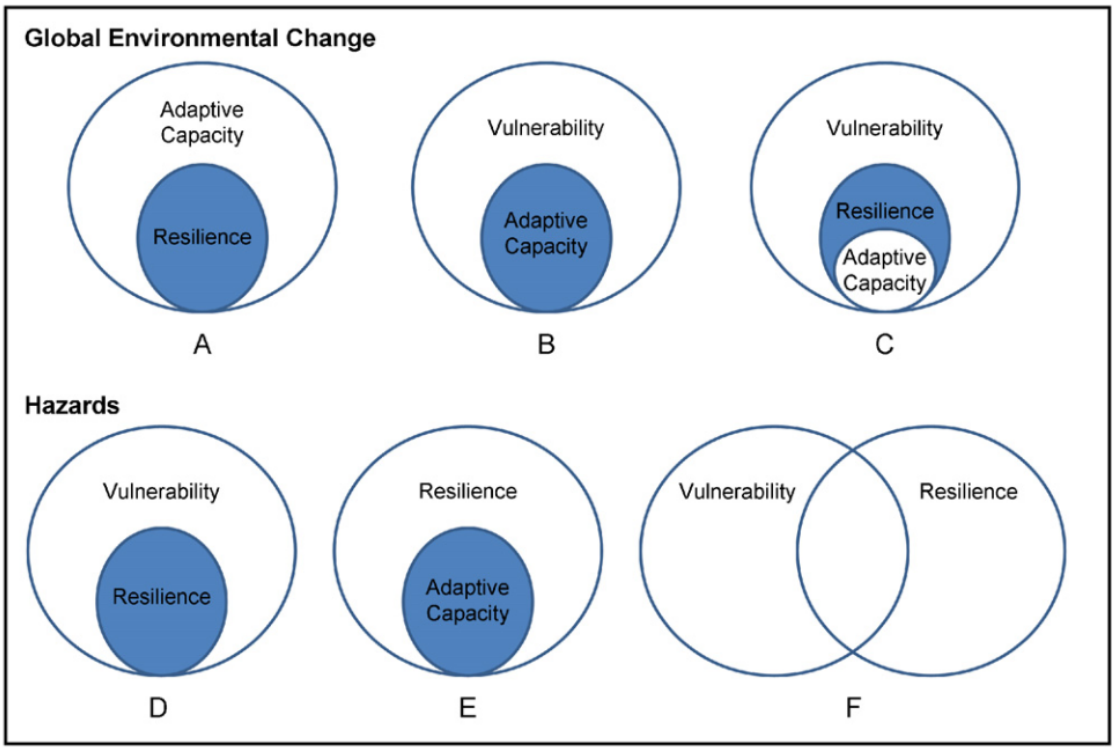


Figure 2.1: Different understandings of the relation between resilience, adaptive capacity and vulnerability; taken from: Cutter et al. (2010)

relations between key terms. While Gallopín (2006) separate capacity of response and sensitivity, I see capacity of response as a part of sensitivity. The difference between their understanding of relations and my understanding is graphically represented in Figure 2.2.

The result of this discussion about relevant key terms should be that the reader is able to understand what I mean when I use the above described terms, which in turn should avoid confusion or different understandings of my interpretation of results later on.

2.2 Resilience frameworks

Now that I have established the key term definitions I am working with through this thesis, we are having a look at what factors actually help to establish resilience. There has been quite a number of frameworks which try to conceptualize the parts of disaster resilience which help systems to adapt to changes (Mayunga, 2007; Cutter et al., 2008; Norris et al., 2008). Norris et al. (2008) for example say that resilience is mainly composed out of networked adaptive capacities. These adaptive capacities are in turn originating from four distinct sources: economic development, social capital, community competence, and information and com-

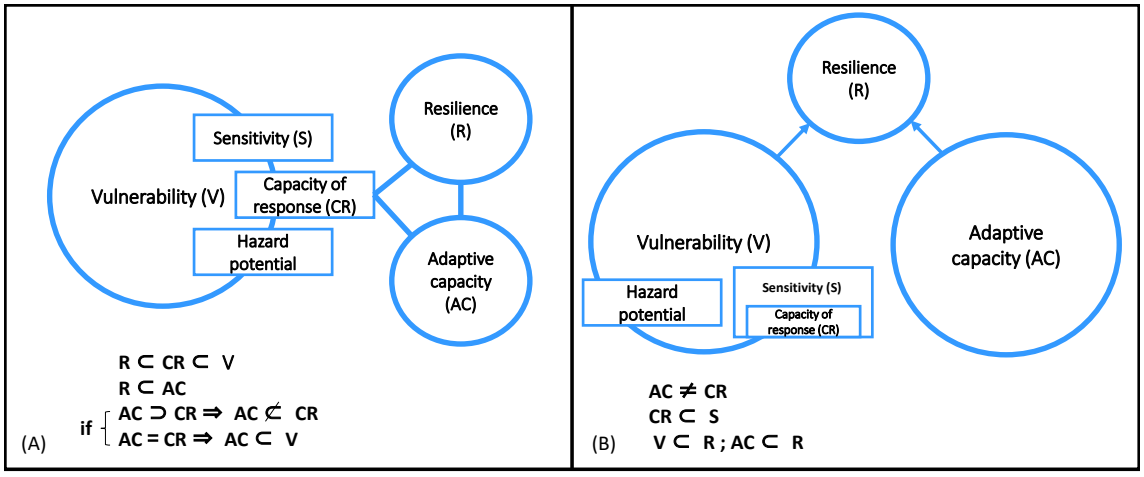


Figure 2.2: Presumed relations between the terms resilience, adaptive capacity, vulnerability, sensitivity, hazard potential, and coping capacity; part (A): presumed relations by Gallopín (2006); part (B): presumed relations by this study

munication (Norris et al., 2008). The core idea behind their framework is that every system possesses attributes which make it more or less resilient against disasters, and that there exist fundamental dynamics between those attributes. The components of those adaptive capacities according to their proposed framework can be summarized as follows (Norris et al., 2008) (see Figure 2.3):

- *Information and communication*: The argument for channels which provide a fluent and functioning stream of information is that in emergencies, groups and individuals need to communicate their needs and options of response to each other in order to be able to select the most appropriate response. This concept embeds not only physical infrastructure, like warning systems, signals and the media, but also the functioning of social networks and their respective exchange of information.

- *Community competence*: One major part of a systems ability to respond to disasters is the collective ability of deciding on appropriate actions and decision making. While a community or a group of people is faced with incoming threats, they need to be prepared and also need to decide quickly on appropriate action as a collective, since decisions have to be made quickly and also implemented efficiently. One example could be drawn from efficient planning for emergency situations and train staff and the general populace in the execution of emergency measures.

- *Social capital*: Functioning reciprocal and altruistic relations between individuals and networks ensure that disaster victims can rely on each other

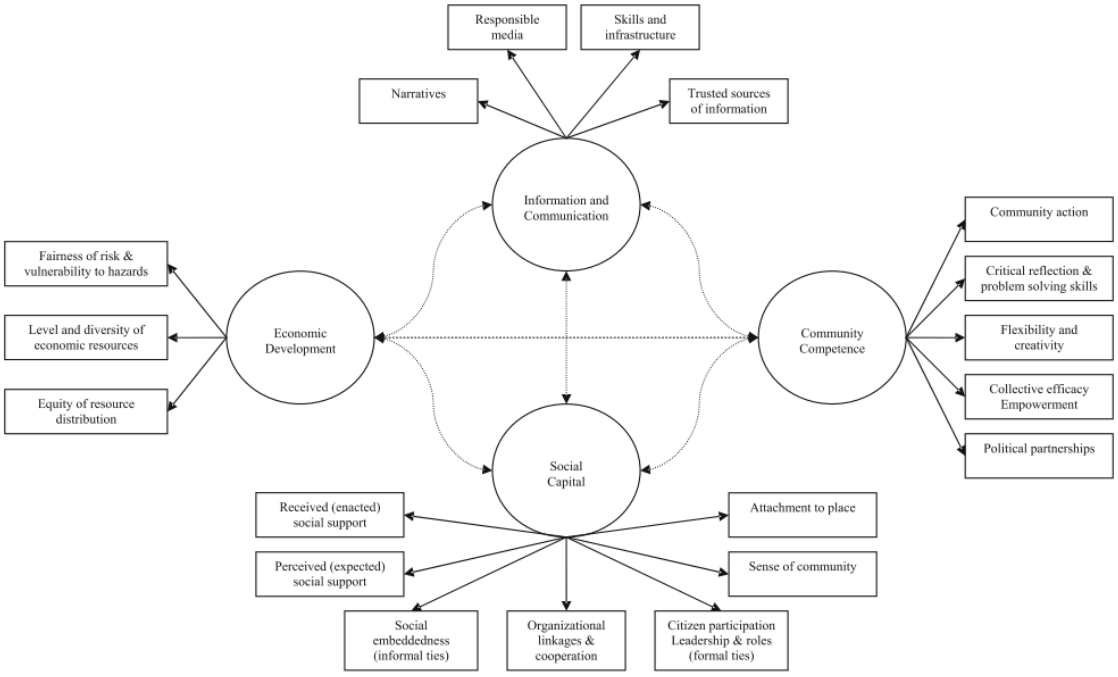


Figure 2.3: Resilience as a set of networked adaptive capacities, taken from Norris et al. (2008)

in times of need and henceforth strengthen the community in its ability to recover from disasters. Also a sense of community which is expressed by individual contribution to- and participation in the community, as well as place attachment contribute to the closeness of relations between stakeholders and therefore increase the likelihood of sharing resources such as labor and goods which are needed to recover.

- *Economic Development*: Clearly the financial possibilities of a system enhance its ability to gain resources which are needed for an efficient disaster recovery. But not only the absolute amount of financial assets may play a role, also the heterogeneity in income sources may strengthen a systems ability to function after a disturbance, since it can resort to other means of income when one should become unavailable.

We can see that each of these adaptive capacities may embed elements of each other, such that Norris et al. (2008) acknowledge that there exist dynamics between those capacities which ensure their respective functioning. Furthermore Norris et al. (2008) provide us with an understanding of the temporality of events, where we see the visualized acknowledgment that these set of adaptive capacities and hence the functioning of a system may very well change due to exogenous disturbances (see Figure A1.1).

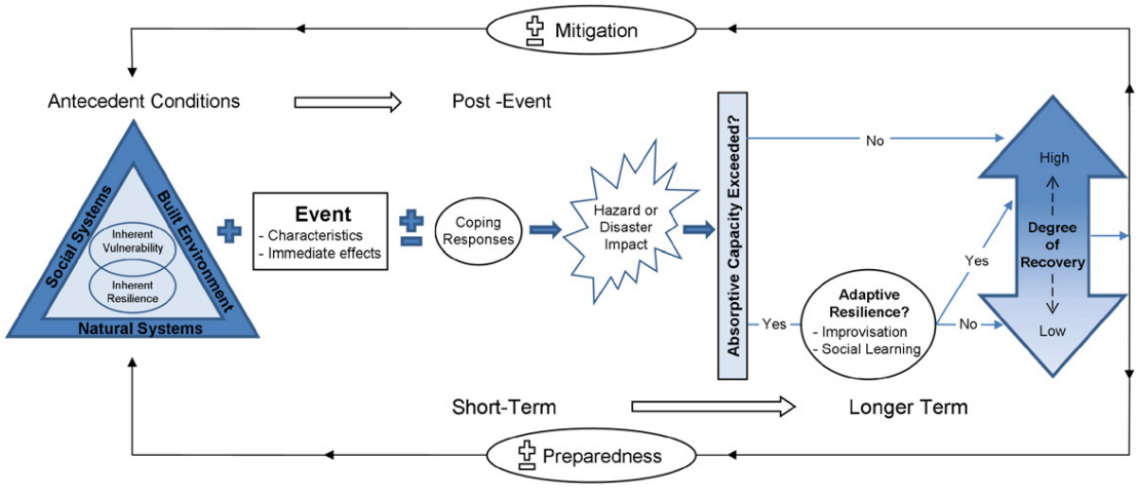


Figure 2.4: The disaster resilience of place (DROP) model, taken from Cutter et al. (2008)

This temporality of events and the respective changes in adaptive capacities can also be seen in another framework by Cutter et al. (2008), the "disaster resilience of places" (DROP) model (Figure 2.4), which also embeds adaptive capacities into the broader concept of resilience which are of economic, institutional, physical, and social nature just like in the framework of Norris et al. (2008), but enhances the idea by integrating a functioning natural system which ensures supply of resources into the concept of resilience. Hence Cutter et al. (2008) acknowledge the existence of six forms of community resilience indicators: ecological, social, economic, institutional, infrastructure, and community competence.

One further framework by Mayunga (2007) also tries to identify candidates for community adaptive capacity by applying the Sustainable Livelihood Framework from the Department for International Development (DFID, 1999). Although the Sustainable Livelihood framework was initially developed to represent necessary factors for sustainable community development, Mayunga (2007) argues that the capital based approach very well can be used to describe disaster resilience, because the concept of sustainable development and resilience are inherently linked (see Brown and Kulig, 1996; Tobin, 1999). This essentially implies that the capital based approach offered by Mayunga (2007) gives an applicable base to measure the broad concept of resilience where the five forms of capital (financial, human, social, physical, and natural) play a central role. These sorts of capital can also be found in in the frameworks offered by Norris et al. (2008) and Cutter et al. (2008), whereas Mayunga (2007) provides us with an easy to apply measurement of individual and community adaptive capacities.

He includes the forms of capital which also contain sets of adaptive capacities

which define the "status", or "functionality" of a given system, be it on the micro or macro-level. Over the years, numerous frameworks to measure disaster resilience, vulnerability, and adaptive capacity have been offered (cf. Birkmann, 2006). However, I decided to integrate the frameworks by Norris et al. (2008), Cutter et al. (2008), and Mayunga (2007) into one framework, since a respective synthesis of those is relatively easy to apply when one has access to longitudinal data about different forms of capital and disaster exposure. The underlying implication of this framework is that a well developed community in terms of endowment of the five forms of capital is consequently resilient to disasters as well (by having higher adaptive capacity). The intuition for suspecting a direct link between the five forms of capital and disaster resilience can be explained by looking at the potential of each of the five types of capital to increase disaster resilience. Social capital for example could be a potential driver to facilitate coordination and cooperation among individuals, as well as other stakeholders like governmental and non-governmental workers. Financial capital might help individuals to gain access to resources such as labor and essential goods needed for daily life, but also might facilitate access to insurance and other financial services that derogate the effects of natural disasters. Human capital broadly speaking might increase an individual's ability to identify risks and potential threats and take according action, such as preparing for potential disasters. Additionally, human capital might increase the capability to identify necessary actions and help in prioritizing tasks after disaster struck. Physical capital, such as warning systems and/or disaster mitigating systems (such as sea walls or dikes) help reducing the immediate effects of natural disasters and henceforth have a direct impact on the strength of disaster exposure. Also natural capital might increase resilience by providing natural protection against a disaster. For example, a densely grown forest might help a mountain village to mitigate the effects of avalanches. Mayunga (2007) makes an additional remark on the temporality of disaster resilience by identifying four phases of resilience: pre-disaster community status, disaster, restoration, and long term recovery, where community status means certain endowment with the forms of capital. Within this temporality framework, Mayunga (2007) visualizes community status (which is defined by its endowment with the five forms of capital) through the four phases of resilience. Based on this view I employ this concept on a framework which was developed with the help and collaboration of my supervisors and external advisers[3].

[3] Björn Vollan, Bernd Hayo, Andreas Landmann, Adam Douglas Henry

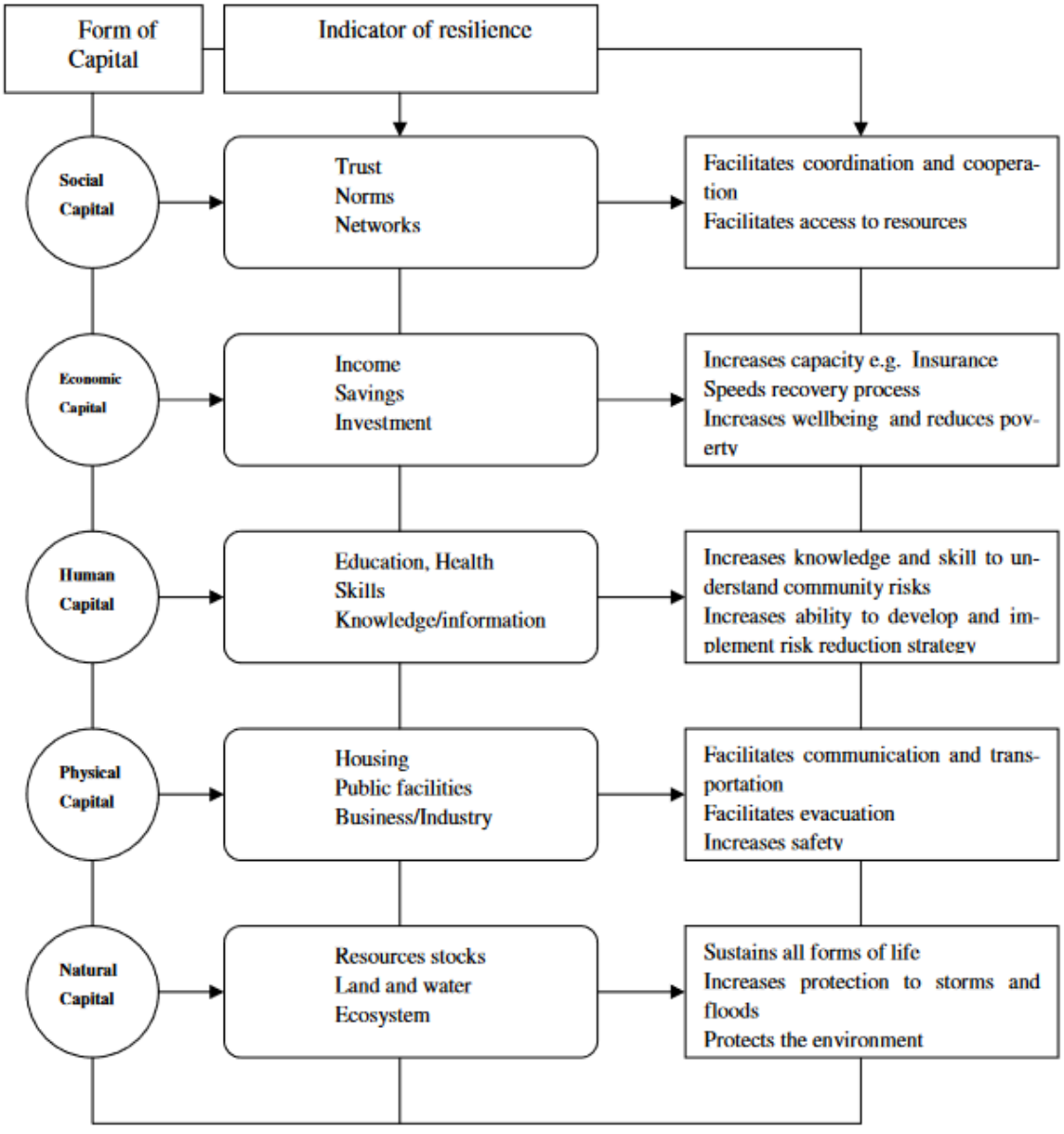


Figure 2.5: The five forms of capital and respective adaptive capacities, taken from Mayunga (2007)

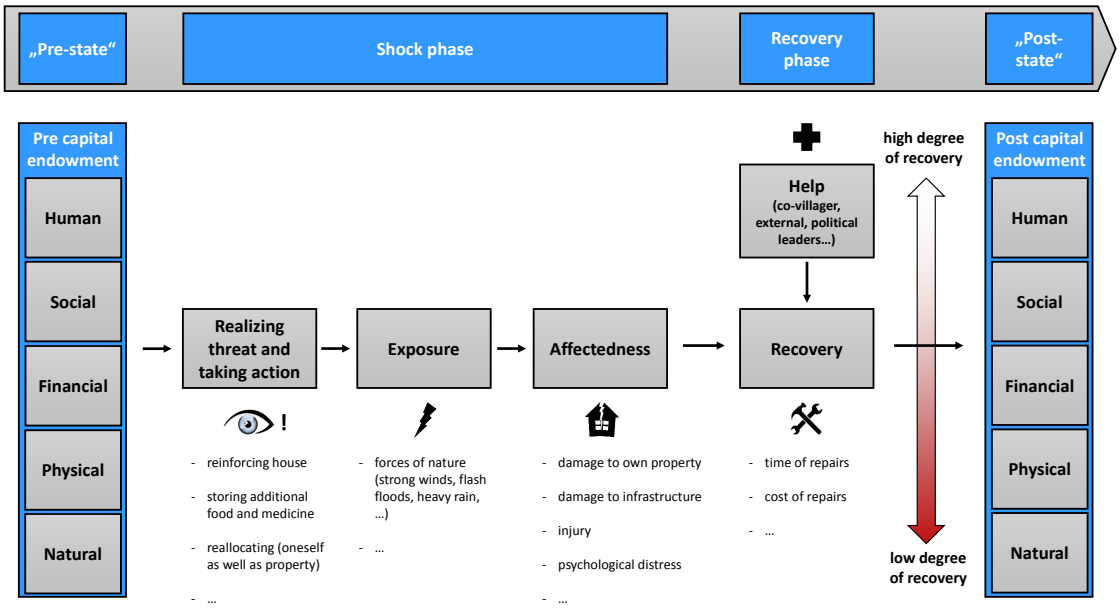


Figure 2.6: Basic framework of this study

2.3 A synthesis of frameworks

In the case of our data we only observe two points in time: two years before, and three years after a major disaster. For explanatory purposes I will moderate through this framework from the perspective of an individual/household. However, I see no reason why this framework could not be applied to larger levels of observation, such as village or country level. Figure 2.6 shows my application of this underlying framework by Norris et al. (2008), Cutter et al. (2008), and Mayunga (2007). This framework represents the temporal order of events and the phases an individual might go through while being confronted with experiencing a natural disaster. At this point I should mention that this framework was explicitly developed to fit into the context of natural disasters, whereas it might also be applied in related fields such as conflict or other man-made disasters. In the beginning (or the "pre-state") an individual has a certain endowment with the different forms of capital which define its resilience to disasters. When the individual realizes that it may be confronted with a natural disaster in the near future it enters the second stage ("shock phase"), where the individual might still have time to mitigate or to avoid disaster exposure (for example by reinforcing its property or by temporary moving to safer grounds). The next station in this framework is the immediate exposure to forces of nature ("exposure") like in our case strong winds, heavy rain, and floods, which in turn directly lead to personal damages, like the damaging of an individuals' household or physical injury,

but also psychological distress which may arise from experiencing suffering of oneself, others, or loved-ones. This already implies the clear distinction I make between exposure and personal damages as a consequence of disaster exposure being a factor which is arguably exogenous in the case of this study, while personal damage might be endogenously defined by pre-capital endowment. When an individual survived the second stage it immediately enters the third stage, the recovery process, which is accompanied by reconstruction and recovery efforts by the individual, but also by external help from, for example, other villagers, outside authorities (like NGO's) or governmental institutions. At the end of the recovery process the individual may be endowed with different levels of the five forms of capital than before because of new experiences, network transformations, transformation of financial endowment, changes in the physical environment (for example upgraded warning systems or mitigation facilities), and transformed natural surroundings. So far it has been acknowledged that governmental programs, targeted at improving the different forms of capital, are helpful to help communities and households to be less vulnerable and more resilient towards disasters (Skoufias, 2007)

In the following subsections I will discuss the role of each form of capital in forming disaster resilience and also discuss the potential impact of disaster exposure on each type of capital.

2.3.1 The role of human capital in disaster resilience

At the early phases during disaster exposure, external help is neither available nor likely to arise in a timely manner and household heads therefore have to engage in two roles at the same time: Firstly they are disaster victims, and secondly they are managers of this situation, needing to prioritize action and planning according reactions to the situation (Al-Maruf, 2017). As a result, individual capability might play a central role when access to external help (like help from neighbors or other outside actors) is limited. Individual human capital might also facilitate decision making processes by making individual's act more decisively. But human capital does not only matter during disaster exposure, also preparing for and anticipating the occurrence of disasters is highly dependent on individual capability, for example by correctly interpreting early warning signs and alarm systems (Drabek, 2013; Sharma et al., 2013). Some articles suggest that human capital acquisition increases the cognitive abilities of individuals, which in turn improves work effectiveness. Hence human capital should also promote effective functioning in a setting where recovery efforts have to be prioritized. Additionally,

the acquisition of human capital increases conscientiousness of individuals, which leads to increasing contextual performance and hence a higher probability of effective disaster relief. Most studies who look at human capital are mostly looking at performance in a labor market setting, whereas the findings should be easy to extrapolate to a post disaster setting, where individuals have to make profound decisions and perform actions which help them to recover in an effective and efficient manner (c.f. Hartog, 2001; Ng and Feldman, 2010).

Some studies explore the relation between different aspects of human capital and resilience empirically, although existing empirical studies are mainly focused on formal education (see Muttarak and Lutz, 2014).

Wamsler et al. (2012) look at the relation between formal education and hazard potential in Brazil and El Salvador. They find that households with relatively lower levels of education are rather located in areas with larger hazard potential. One possible channel for this empirical observation might be that less educated individuals are more likely to underestimate the probability of disaster exposure.

In a sample of 557 Thai individuals, Muttarak and Pothisiri (2013) investigate the correlation between formal education and disaster preparedness. Following interviews conducted after the Indian Ocean earthquakes from 2012, they find that individuals with higher levels of education were more engaged in disaster preparation measures and therefore conclude that disaster preparation education programs are most effective when received by highly educated individuals.

In a longitudinal study, Frankenberg et al. (2013) look at the relation between education and disaster recovery. They use survey data from roughly 3,400 Indonesian inhabitants that were diversely affected by the Sumatra Earthquake and the resulting Tsunami in 2004. Their data set contains observations from four months before, and five years after the disaster. Their findings suggest that education is predictive for males survival rate, but not for the survival rate of females. Additionally they observe that more educated individuals were in better general psychological shape compared to less educated individuals five years after the tsunami and hence they conclude that education might play an important role in contributing to individual disaster resilience.

Integrating the findings from previous studies, I identify two channels how human capital might influence disaster resilience (Figure 2.7). The first channel consist of a direct causal relation between human capital and realizing potential threats and taking according action. This results in higher potential for disaster mitigation or avoidance actions to take place and therefore has strong potential to moderate damages or injury due to disaster exposure (reducing sensitivity). The second

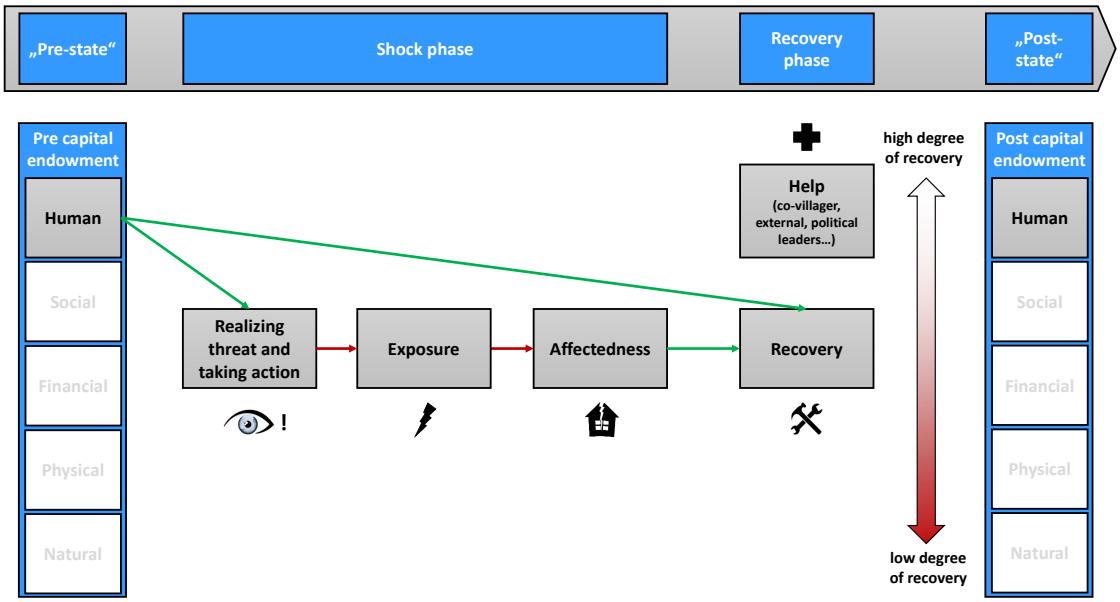


Figure 2.7: Framework of this study from a human capital perspective and associated causal relations

channel consist of direct impacts on the disaster recovery process, since individuals endowed with high human capital should be able to prioritize necessary action and better plan the acquisition of resources needed for efficient disaster recovery (increasing resilience through higher adaptive capacity).

2.3.2 The role of social capital in disaster resilience

The importance of social capital in disaster resilience and relief has been highlighted recently by numerous scholars of economics and behavioral sciences and almost none of the five forms of capital has gained as much attention as social capital (see Masten and Obradovic, 2008; Adger, 2010; Aldrich and Meyer, 2015). Measures for social capital that are commonly used to determine the extent of social cohesion within a certain group of individuals are mainly degrees of trusting each other and the structure of social networks. Also voluntary engagement in actions benefiting a social group like communities and involvement in local associations and clubs is seen as an indicator for social engagement of an individual (see Paldam, 2000; Aldrich and Meyer, 2015; Lin, 2017). A major focus in defining the degree of social capital within a certain social group lies in identifying the degree of access to resources that are allocated within a certain group. Translated to a more simple way of understanding social capital: Social Capital is defined by the ability of a person to access certain resources within a social structure. At this point we should draw a particular distinction from human capital, which

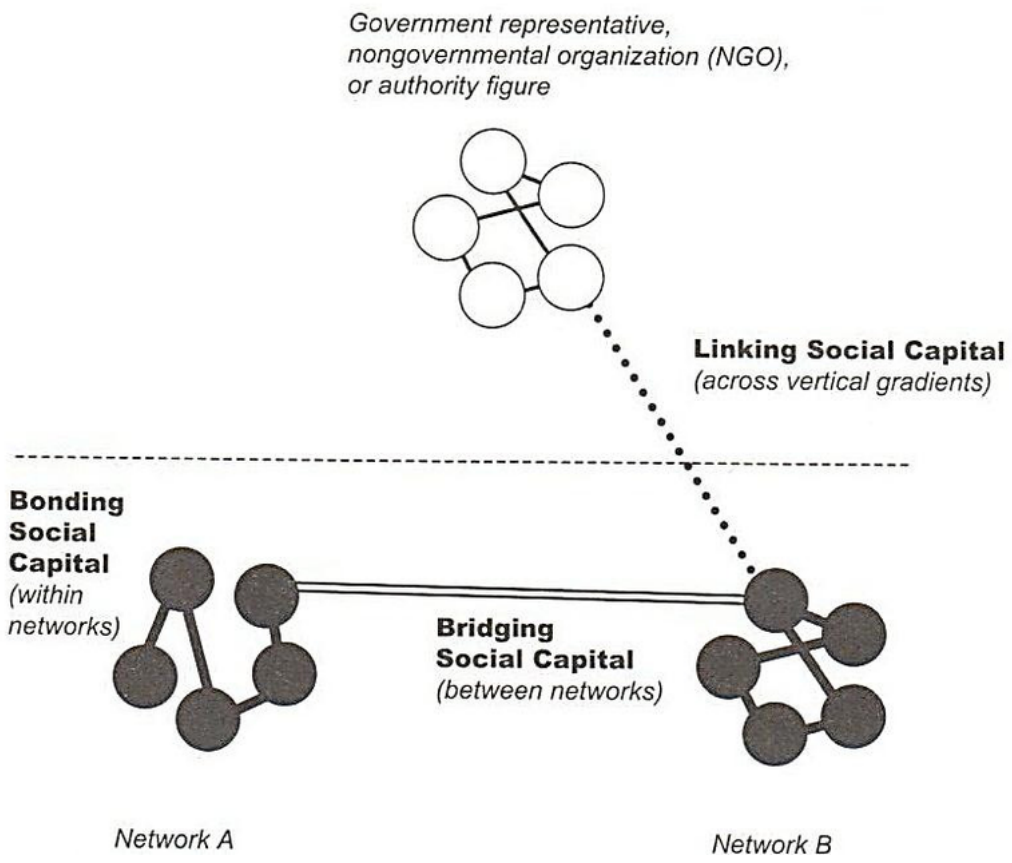


Figure 2.8: Bonding, bridging, and linking social capital (taken from: Aldrich, 2012a)

embeds elements of an individual's ability such as education, intelligence and know-how. This distinction is also highlighted by Burt (2000) stating that individuals with more social capital are better at seizing opportunities and using the full potential of their human capital. Therefore I understand social capital as all characteristics and social ties that enhance an individuals' ability to activate its social surroundings in a way which benefits the individual.

In the context of this study, social capital should foster the ability to access resources (in cash or in kind) in times of need after a disaster. Such resources could be financial relief aid provided by governmental official's or NGO staff, or the help and resources of friends and neighbors, such as manual labor, food and drink, medicine... or other necessities which foster disaster recovery. Generally the literature distinguishes between three different categories of social capital: bonding, bridging, and linking (Aldrich, 2012b; Kawachi et al., 2004; Szreter and Woolcock, 2004)[4].

Bonding social capital describes the tendency of individuals to interact with others who are similar to them in terms of general behavior and socio-economic

[4]As citet in Aldrich and Meyer (2015)

circumstances (see Lochner et al., 1999; Putnam, 2000; Harpham et al., 2002). Bridging social capital summarizes the ability to interact with groups and individuals that are not usually within the ordinary social structure of an individual. Since bonding social capital by trend leads to fairly homogenous groups of people, bridging social capital ensures interaction between differently specialized groups and therefore ensuring productive exchange of abilities, resources, and know-how. Bridging social capital building institutions are mostly identified to be organizations that bring people from different backgrounds closer to each other, like clubs and associations (Granovetter, 1983; Small, 2009). Linking social capital differs from the other categories by highlighting the relation between two social networks that are different in their location within the social hierarchy. This relation accents the interaction with social networks that have some sort of authority over the other (Szreter, 2002). Figure2.8, taken from Aldrich (2012a), visualizes the concept. Although the theoretical connection between social capital and resilience is well established, there is still a considerable lack of empirical work testing this relationship.

Hawkins and Maurer (2009) provide a descriptive analysis of qualitative interviews to highlight the role the three categories of social capital played in the aftermath of hurricane Katrina, which happened in 2005. From interviews with 40 household-heads from New Orleans Hawkins and Maurer (2009) show that bonding social capital played a major role in the first moments after the storm hit. People tended to help those who were closest to their own social network, like friends, relatives and immediate neighbors. Bonding social capital also plays a major role in the reaction to a natural disaster, since people tend to adapt their own behavior to the behavior of their friends and loved ones (cf. Drabek, 2013). This insight is crucial to understand why people tend to react to disaster in certain ways, for example by deciding if to flee or stay, or to follow or ignore warning signals. The distinction between bridging and linking social capital was less salient because hierarchical structures became less important as they usually are in everyday life. However, Hawkins and Maurer (2009) give examples of how bridging social capital benefited some African Americans by connecting to Caucasians which had access to more information that was needed for a better acquisition of disaster relief goods and services. Thereby the ability to overcome social barriers and to put trust in individuals with whom a group usually does not interact with may play a larger role in disaster relief than one may suspect, ensuring that differently specialized groups are better able to share their abilities and know-how if bridging social capital is well pronounced (Granovetter, 1983).

Regarding linking social capital, Hawkins and Maurer (2009) state that the initiatives of local neighborhood coalitions to establish connections with out of town governmental institutions and NGO's was also a main driver in securing relief efforts.

Empirical evidence regarding the importance of social capital in disaster recovery shows that communities with strongly developed social capital have usually higher satisfaction with disaster recovery and also a faster recovery process. One example can be drawn from Nakagawa and Shaw (2004), who investigate how levels in bonding, bridging, and linking social capital correlate with the recovery time of villages after the Kobe and Gujara Earthquake. They find that villages with the highest measured social capital indicators (such as trust, networks and community participation) also performed best in terms of a speedy recovery and satisfaction with town-planning.

From a case study in Bangladesh, Islam and Walkerden (2014) investigate the role of bonding and bridging social ties in disaster recovery after cyclones. They conducted key informant interviews and focus group discussions, as well as individual interviews with household heads from two rural villages in Bangladesh that were heavily affected by tropical cyclone Sidr. They conclude that especially in the early phases after a disaster, bonding and bridging social ties have higher importance to be able to cope with the consequences of a disaster. However, they also conclude that over time these social ties become less prioritized by individuals due to a lack of physical and financial capital. Additionally they observe that bonding ties tend to be very stable, whereas bridging ties are prone to become less important due to poverty and competition for external support.

An empirical study by (Hikichi et al., 2017) investigates the relation between social capital and cognitive decline. By looking at balanced longitudinal survey data from 3,566 elderly Japanese individuals from before and after a major earthquake and following tsunami in 2011 they find that social cohesion is negatively and significantly correlated with cognitive decline due to being affected by a natural disaster, although the effect sizes they find are rather low.

But is social capital as part of resilience itself also potentially subject to change because of natural disasters? Do people engage more or less in social capital building as a response to a disaster? An empirical study by Yamamura (2016) provides more information to answer these questions by looking at a massive amount of survey data (n=488,223). They investigate the causal relation between distance to the epicenter of an earthquake (Hanshin Awaji earthquake from 1995) and the engagement in community activity with the help of a longitudinal study

design, very similar to our own. Using difference-in-difference regression they find that engagement in community activities increased more over time in villages that were closer to the epicenter of the earthquake. This implies that social capital, if it truly helps building resilience to natural disasters, might be reinforced by disasters themselves as well.

If I apply the accumulated information I just established by looking at related studies and theoretical concepts to the framework which I raised in section 2.2, it seems that two channels through which social capital might influence disaster recovery become apparent. The first channel consists of an individual being more likely to engage external aid providers, like NGO's or governmental agents, by being more likely to attain information about external disaster relief processes and therefore be more likely to attain needed resources. This increaed likelihood might stem from either a better connectedness to local authorities or external aid providers (linking networks), or higher levels of trust and thereby increasing likelihood of interactions between external aid providers and disaster victims. The same goes for the mobilization of informal networks and ties between friends, family, neighbors and other stakeholders from the same hierarchical level (therefore increasing resilience). These ties might to some extent be reciprocal, meaning that households with higher levels of solidarity are more prone to receiving help from others, which in turn could be especially true when overall levels of solidarity are relatively high within a community. The second channel consists of the access to information regarding potential disaster before it strikes. For example a well networked individual might gain access to relevant information (like the location of appropriate emergency shelters) and also access to outside help to prepare for the disaster (for example by mobilizing labor to reinforce the structure of a house). A not so well networked individual might have to rely solely on his/her own human and financial capital, while well networked individuals might be able to mobilize human and financial capital of others as well. These two channels are represented in Figure 2.9.

2.3.3 The role of financial capital in disaster resilience

The underlying intuition behind the connection between financial capital and disaster resilience is mostly straightforward. Individuals that are well endowed with savings, income flows, and well functioning insurance mechanisms might find it easier to recover from the aftermaths of natural disasters since they struggle less to access and mobilize resources. Although provision of well targeted ex-ante measures to alleviate the effects of natural disasters such as insurance and financial

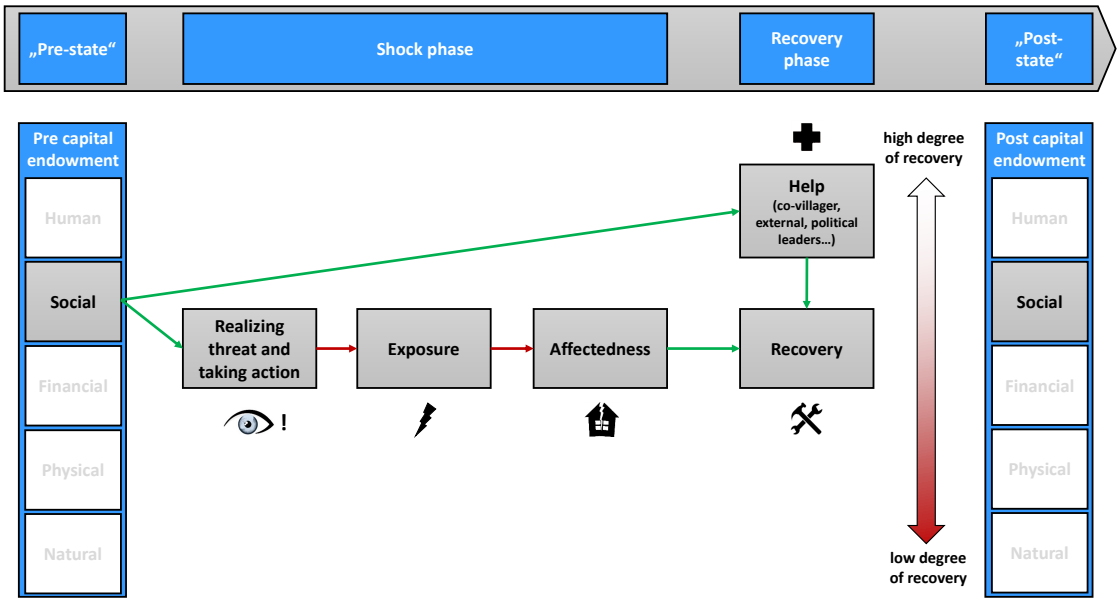


Figure 2.9: Framework of this study from a social capital perspective and associated causal relations

relief in times of need has high potential to do so (Skoufias, 2003; Le Quesne et al., 2017), access to insurance mechanisms might be highly dependent on a households' financial endowment and therefore poorer households tend to be more vulnerable to disasters and also are subject to becoming even poorer because of the effects of disasters, and therefore even more vulnerable (Morduch, 1994, 1999). Another channel which might increase resilience to shocks are the number of sources of available income (Macours et al., 2012, 2013), which increases an individual's chance to still receive income when one or more of the available sources are no longer available due to some sort of transformation of circumstances. Another way in which financial capital might help to decrease vulnerability is through better access to warning systems and other sources of information (Mark and Semaan, 2008; Mark et al., 2009). Drawing from the example of the Philippines, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) also operates through smartphone applications which enable smartphone owners to immediately receive warnings as soon as there is a threat of a severe tropical cyclone making landfall nearby (PAGASA, 2018). Thereby the access to critical information might very well be determined by access to technology and thereby financial endowment. A study which implies this connection by Mark et al. (2009) looks at interviews from 45 individuals that experienced the war in Iraq in the year 2003. They show that new technologies helped the interviewed persons to connect to different religious groups and gain

access to more and diversified information.

Some studies provide empirical verification of the previously presumed connections between financial capital, vulnerability, and resilience.

An analysis of data from the Jamaica Survey of Living Conditions (JSLC) from roughly 210 households by Clarke and Wallsten (2003) looks at the relation of remittances and damages due to hurricane exposure. The authors look at cash flows that come from relatives living abroad over ten years (1989-1999) and look at the relation between these cash flows and hurricane inflicted damages. They find that remittances might have similar properties as insurance, alleviating roughly 25% of costs that were inflicted by the hurricane.

Another study by Skoufias (2007) looks at a poverty alleviation program in Mexico which provides target orientated in cash transfers (which in term are provided on the condition that recipients use those funds partly for schooling fees and mandatory visits to public healthcare institutions) for households identified as poor with children in school grades 3-9 and/or pregnant women and its impact on insurance and consumption. Although the author did not find substitution effects for formal or informal insurance, he did find however a significantly higher resistance of food consumption to income shocks. Hence he concludes that such in cash transfers could potentially reduce households vulnerability to hazards.

A randomized controlled trial by Macours et al. (2013) conducted in Nicaragua with about 3,000 households investigates if and how different poverty alleviation programs mitigate effects of droughts on household consumption. They find that in cash transfers provide short term protection against drops in consumption in the short term, but emphasize the long term role of grants for vocational training, which made participants 13% more likely to engage in non-agricultural self employment, which therefore made them less vulnerable towards droughts.

Empirical studies of the effect of disaster or bad weather insurance on disaster resilience are not as well established as studies about take up rates of insurance in developing countries (Macours et al., 2012). However, an empirical study by Carter et al. (2007) shows that recovery rates of households after disaster highly depend on initial wealth levels and therefore the authors discuss the existence of natural disasters to be potential poverty traps. Consequently, when poorer households had access to formal insurance to alleviate the effects of disasters they might be less likely to get into some sort of poverty trap.

In conclusion, financial capital might operate through three distinct channels in which it helps to increase disaster resilience (Figure 2.10). The first channel consists of the previously mentioned access to technological means which en-

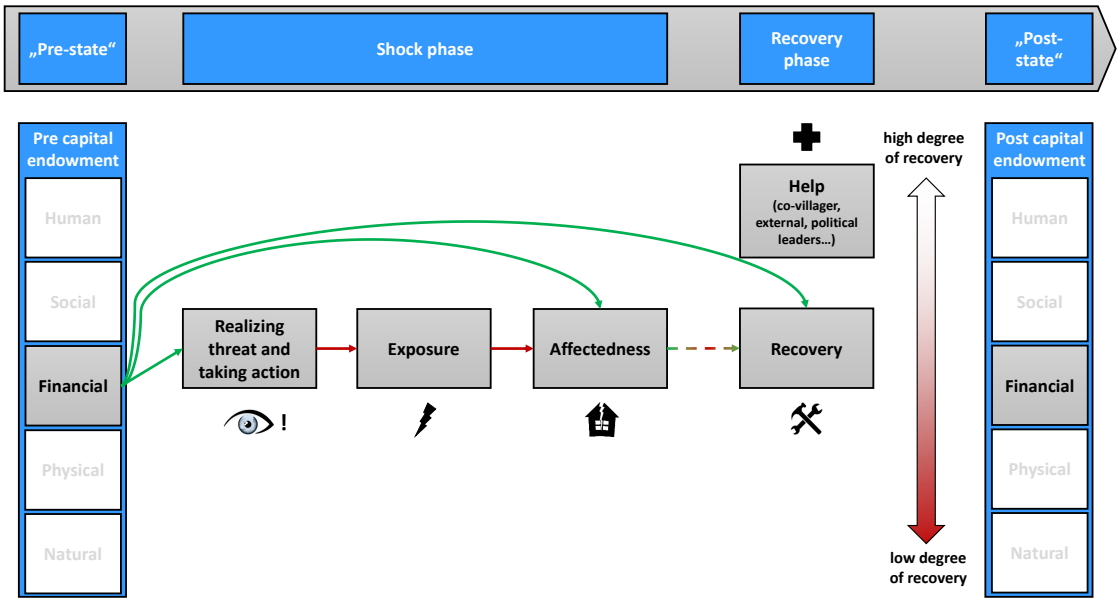


Figure 2.10: Framework of this study from a financial capital perspective and associated causal relations

able sooner disaster awareness and hence longer preparation time. Additionally, individuals endowed with better access to technology might also find it easier to access information which helps them to develop strategies to cope with the aftermath of disasters. The second channel consists of institutions which ensure liquidity of a disaster struck individual such as insurance and savings. These institutions assure that an individual is still capable to mobilize the necessary resources to recover from disaster. The third channel, although quite intuitive, is not very much discussed in disaster literature, namely the correlation between an individuals financial endowment and losses to disaster. Naturally, an individual with more expensive housing might have severely higher costs of repairs if the house is destroyed in the same relative terms as a not so expensive house (let us say for example that a volcanic eruption made both types of houses inhabitable). Therefore the ability to recover highly depends on the relative amount of losses compared to the amount of liquid financial assets. A well endowed household without according insurance mechanisms and savings might never return to its pre-disaster status quo, whereas a poor household with similar access to insurance and savings might recover more quickly, given both households did not fall into the previously mentioned poverty trap. As we can see from this example, it is not necessarily the case that more financial capital always leads to higher resilience and the problem seems more context dependent.

2.3.4 The role of physical capital in disaster resilience

Physical capital is broadly defined as everything man made that provides access to easier production processes and infrastructure (DFID, 1999). In our context this includes access to sanitation, power and transport, but also the presence of information and warning systems. Additionally, facilities that provide protection against direct impacts of a natural disaster, such as disaster mitigation structures, can be administered to physical capital of a community as well. The role disaster mitigation measures such as flood protection constructs like dykes to reduce vulnerability to floods is essentially straight forward, since their sole purpose is to mitigate effects of disasters. Also the physical composure and static properties of houses determine the vulnerability of a household to disasters. However, I would like to extend the classical definition of physical capital, being understood as everything man made that can be accounted to the individual capital stock, by claiming that the locality of homes, described by features like altitude or distance to higher risk areas such as almost sea-level beaches is also relatable to physical capital since locality is a direct consequence of individual choices where to reside. While how and where to build disaster resilient homes is more related to structural engineering, the question if individuals have the underlying access to resources and know-how to build resilient structures is fundamentally an economic one. Sustainable housing in the context of recurrent natural disasters is only achievable if the affected population is also able to afford it. Therefore a lot of effort has been focused on developing resilient structures which are also affordable to locals, especially in developing countries (for examples see: Garnett and Moore, 2010; Brown et al., 2012). At this point I also want to highlight the importance of functioning warning systems, which has already been discussed in subsection 2.3.3.

Carefully observing hazard zones and potential effects of natural disasters is crucial to understand how to build less vulnerable communities. Therefore the degree to which disasters are considered in city planning is potentially also a promising channel to increase the physical capital of cities and communities (Burby et al., 2000).

Although warning systems have been proven to help people avoiding personal exposure to disasters, there are cases where substantial degrees of heterogeneity in their functionality have been shown (Drabek, 1999; Sorensen, 2000).

Sanitation and water supply plays a major role in the provision of communities with live essentials. Especially rural areas where access to drinking water and sanitation facilities is limited are prone to disasters destroying their access to

clean freshwater, either by destroying facilities which provide fresh water directly, or, for example, by the contamination of fresh water basins with saline water because of floods (cf. Falkland, 1999). Therefore, improving fresh water access in a sustainable manner is also one aspect of building sustainable livelihoods in a disaster prone context (cf. Howard et al., 2010).

A meta study by Shreve and Kelman (2014) looks at studies which conduct cost-benefit analysis to evaluate the usefulness of disaster mitigation measures. These measures vary in their nature and extent, as well as their level of application (household-, community-, national level). Although the authors highlight methodological caveats by the studies under investigation, they also highlight their reported cost-benefit ratios (CBR's), varying mostly between 2-60. Therefore this meta-analysis shows the relative effectiveness of improving a systems physical capital targeted to increase disaster resilience.

As previously mentioned, the two channels through which physical capital increases disaster resilience is mostly straight forward. First and foremost, the quality of physical protection against disaster impacts, such as disaster mitigation facilities, are directly targeted to reduce the direct consequences of disasters, therefore reducing the sensitivity of a system. The second channel can be identified as the provision of facilities which help individuals to avoid disasters, such as functioning warning systems. Although most studies look at physical capital on the community level, we should be able to infer relations between physical capital and disaster resilience on the household level, such as that the overall structural stability of houses might play a role in preventing damages. Figure 2.11 shows the relation between the channels of physical capital and affectedness.

2.3.5 The role of natural capital in disaster resilience

Natural capital in the context of this study is understood as all natural assets and resources which surround an individual and therefore consists of all natural resources which an individual theoretically has access to (cf. Ekins, 1992; Ekins et al., 2003). In a society which strongly depends on fishing and farming, economic output and the overall livelihood of households is dependent on the general condition and absorptive capacities of their surrounding natural assets. Therefore the initial condition of natural assets plays a key role in terms of food security and the general economic well being of a household. But not only the access to resources relevant for economic output play a role in the context of natural disasters, but also all assets which provide natural protection and barriers against the forces of nature. I discussed this relation already in subsection 2.3.4. For

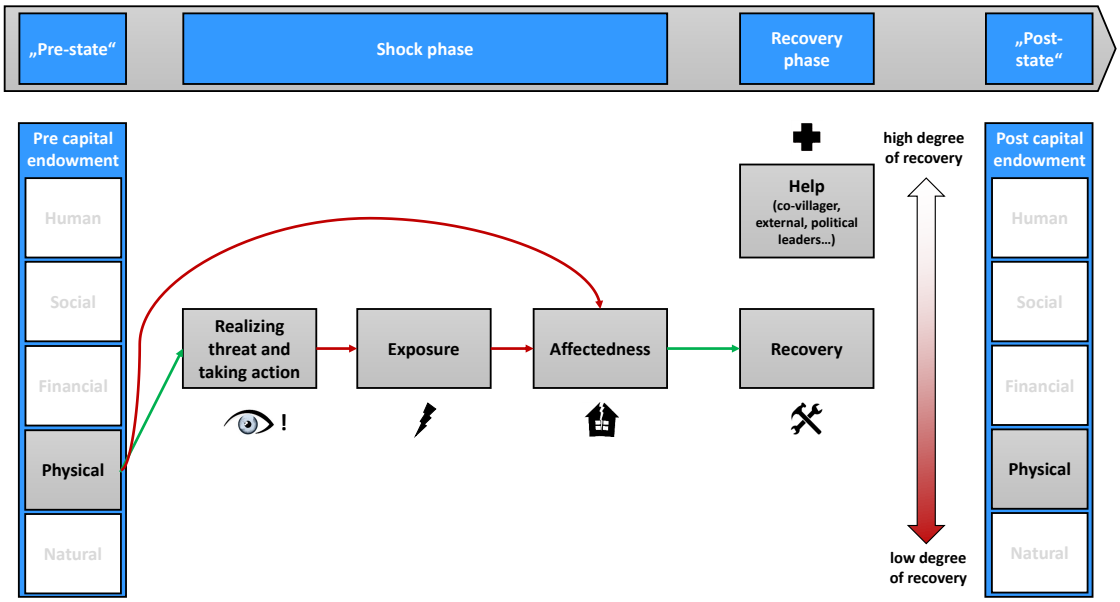


Figure 2.11: Framework of our study from a physical capital perspective and associated causal relations

example, woods provide well known protection from strong winds, protect soil from erosion and provide substantial protection from floods by increasing the absorptive capacity of the ground.

But not only the physical protection provided by natural assets contributes to disaster resilience. Also their contribution to ecosystem services is of special importance, especially when individuals living near those systems highly depend on their functioning. For example, the livelihood of coastal fishermen highly depends on the extraction possibilities of marine resources. If these possibilities are sensitive to natural disasters, as a consequence the livelihood of fishermen is also negatively influenced by natural disasters. This example can easily be extrapolated to other areas where individuals highly depend on functioning ecosystems. Therefore the quality and resistance of natural systems to forces of nature is contributing to disaster resilience.

For example, mangrove forests may help in protecting communities from physical forces of nature, while they also may provide habitat for living beings and hence improve biodiversity. Therefore, the notion is that the more and the higher the quality of mangrove forests, the higher their capacity to absorb direct impacts of tidal waves and strong winds (Dahdouh-Guebas et al., 2005; Alongi, 2008). Therefore a functioning natural system that is able to absorb the impacts of disasters provides long term extraction opportunities and hence its own resilience towards shocks is crucial for sustainable livelihoods. This means that not only

the absorptive capacity of a natural system is crucial to define how vulnerable a system is, but also the speed at which this system is able to recover from a shock and is able to bounce back to its pre-disaster status quo (cf. McLeod et al., 2009).

Therefore, natural assets such as mangrove forests also provide physical protection against the forces of nature. For example, a study by Hochard et al. (2019) investigates the relation between the average width[5] of mangrove forests in global communities and nighttime light production after cyclone exposure. They use a data-set of almost 2,000 communities across 23 countries and find that communities with above average mangrove forest width have higher nighttime light production than average communities after cyclone exposure. Hence mangrove forests may play a part in conserving economic output after a storm or flood due to decreased sensitivity of the surrounded community.

In conclusion I define two distinct key-channels through which natural capital is able to influence individual or household disaster resilience (see Figure 2.12). The first channel consists of natural capital being a direct source of food and income, which means that a more resistant natural system should provide more extraction possibilities after a disaster than a less resistant system. As a consequence, individuals engaged in first sector production, like fishermen and farmers, should be able to benefit more from their natural surroundings than people living near less resistant systems. One example could be areas which are actively designed and supported in a way which is meant to minimize the effects of a disaster on the one hand, and provide stable sources of income on the other hand, such as mangrove forests and marine protected areas (cf. McLeod et al., 2009). The second channel natural capital might protect individuals from the forces of nature is simply the protective features of intact natural surroundings, as I previously explained with the help of mangrove forests as an example.

The previously mentioned meta study in subsection 2.3.4 by Shreve and Kelman (2014) also includes cost benefit analyses of measures which increase the natural capital of a system. These measures include for example the provision of heterogeneous seeds to farmers prone to drought, tree planting on riverbanks against flooding and erosion and mangrove planting at the seashore. The results of the studies that carried out the cost-benefit analyses showed that the benefits mostly outweigh the costs of such projects.

[5] From land to the furthest mangrove tree in the water.

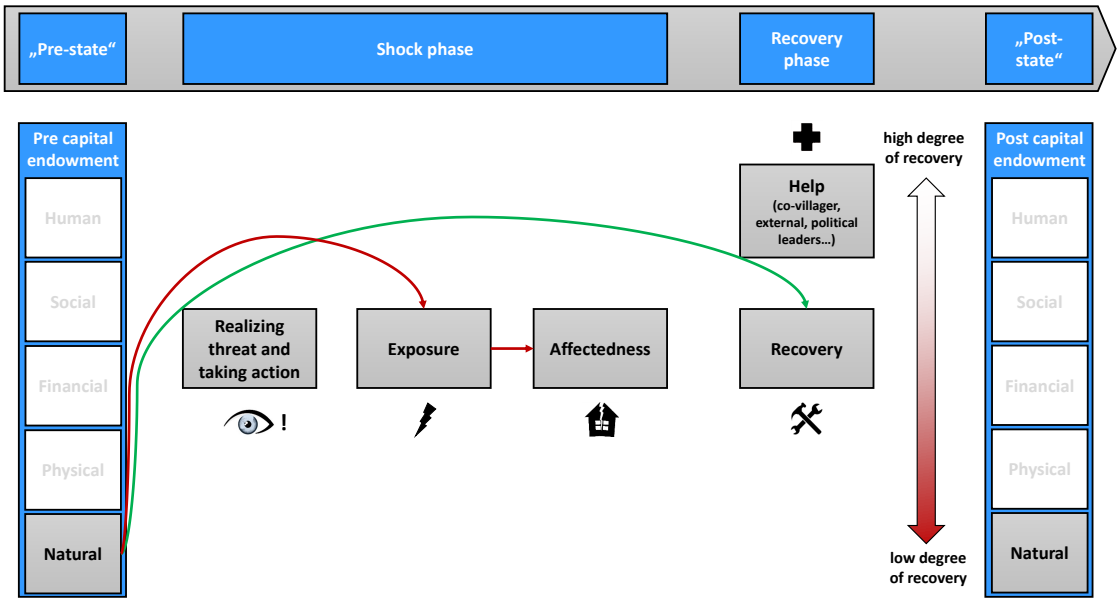


Figure 2.12: Framework of this study from a natural capital perspective and associated causal relations

2.4 Diverse effects on capital & behavior

A substantial number of recent studies has investigated the effect of natural disasters on different aspects of the different forms of capital and human behavior. There is quite a substantial body in experimental literature from all over the world that shows long-lasting effects of natural disasters in many different aspects. However, the results of the studies do not always reach the same conclusions regarding the effect of natural disasters. In this section I want to discuss the most popular findings from the literature regarding the effect of natural disasters on different aspects. Some effects of natural disasters are quite straight forward since their impact tends to have salient consequences on some forms of capital. For example, forms of natural capital are most likely in a worse condition after a disaster than before. It is hard to come up with examples where this is not the case. The same goes for physical capital, although the short and long term effects may very well differ substantially. If we think about disaster mitigation facilities, it might be that disasters deal a certain degree of damage to structures which are targeted to mitigate the strength of some sort of disaster exposure. However, since humans tend to adapt to their natural surroundings and respond to changes in their environment, long term adaption and therefore an increase in efforts to improve disaster mitigation facilities and other aspects of physical capital, such as warning systems, seems very likely. This relation is also prominently implied by numerous studies which look at the problem on a more macro-based view (see

Kousky, 2014, p. 589-590). Negative short term effects on financial capital are also quite intuitive, since income possibilities and especially extraction possibilities of natural resources, which are crucial to lowly developed communities, become less accessible as a consequence of a severe disaster (cf. Benson and Clay, 2004). However, if and how individuals are able to seize opportunities which arise from this new situation and therefore financially profit from it somehow in the long term remains subject to deeper investigation. I want to discuss the effects of natural disasters on social capital and social preferences, as well as the effect of natural disasters on other aspects of human behavior (such as risk and time preferences) in sections 2.4.1 and 2.4.2, since these channels have been investigated more thoroughly in the recent past and deserve to be looked at separately. Let me say at this point already that the effects of natural disasters on social capital are not clearly established in the empirical literature (for a more detailed discussion see section 2.4.1). Therefore, the remaining form of capital which I have to discuss in this section is human capital. The effects of natural disasters on human capital are not that straight forward. Learning from experience and going through the different phases of a disaster might help to develop the personality of an individual in a way which allows him/her to adapt to disasters and be better prepared next time. However, this view only incorporates all learning from experience and excludes future learning possibilities. For example, a meta-study by Baez et al. (2010) shows numerous studies which show that school attendance of children declines after a natural disaster and therefore has a long term impact on next-generation education. Also studies discussed by Baez et al. (2010) uniformly show increases in child labor, malnutrition, morbidity and illness, as well as decreases in mental health. Therefore, we can acknowledge the substantial negative effects of natural disasters on human capital. However, we cannot exclude the possibility of positive channels which help humans to adapt to difficult circumstances. To conclude, I am not entirely able to come to any clear prediction for the causal long term relation between disaster exposure and four forms of capital (financial, social, human and physical), whereas the prediction for natural capital seems straight forwardly negative. However, since an individual goes through the recovery phase, the outcome of the five forms of capital seems to be rather unclear and therefore we have to see what happened in the case of typhoon Yolanda to get a picture of what outcome is possible. In any case, I can identify at least three clear causal channels presented in Figure 2.13. The first channel consists of the mobilization of relief efforts by either external (government, NGO's) or internal (friends, neighbors and family) actors which gets activated after a disaster occurred. These efforts

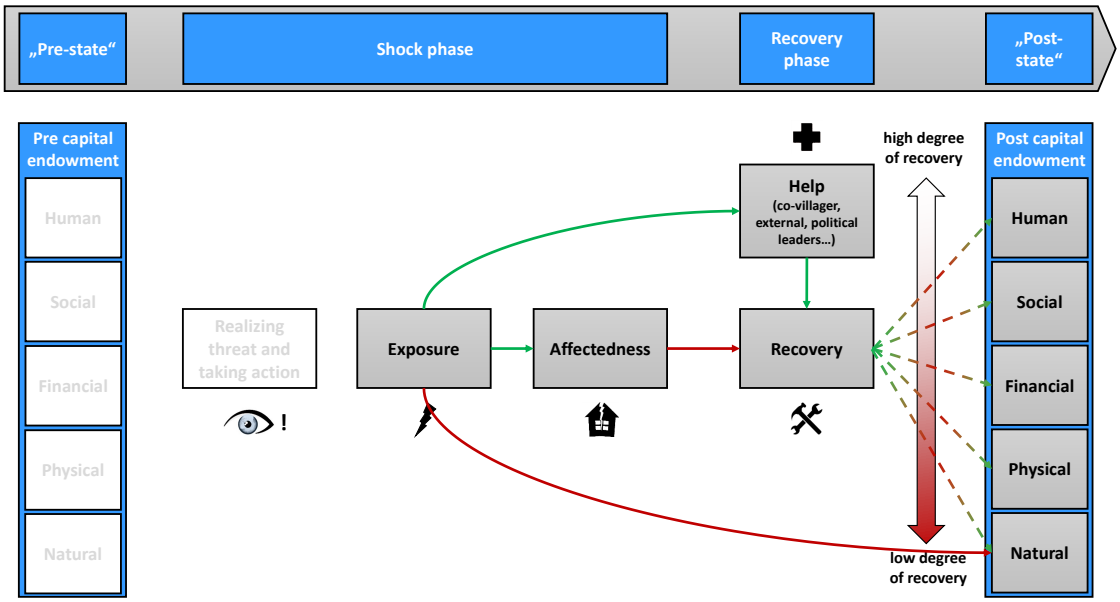


Figure 2.13: Framework of this study from an exposure perspective and associated causal relations

are targeted to increase the degree of recovery. The second channel consists in the nature of disaster exposure by causing direct damages to either personal property or by causing injuries, whereas the speed of recovery is subject to the degree of personal damages. The third channel consists of direct impacts on assets of natural capital, such as (for example) destruction of crops, livestock, and/or natural resources such as forests. The resulting effects on the different forms of capital are as a result rather unclear, since many channels could be relevant for their development to the “post-state”.

2.4.1 Social capital and social preferences

As a larger part of social capital, social preferences have recently received more attention in disaster literature. Pointing out the dynamics that foster faster disaster recovery, I have already shown arguments for social capital being one potential driver for more cost efficient and faster disaster recovery. However, since social capital and social preferences share a lot of common features, this section provides a bit more detailed insights from the literature regarding specific facets of social capital, namely social preferences like altruism, trust and reciprocity. Extreme natural disasters significantly alter the way of life of individuals in many different aspects. First and foremost, the individual capital stock can be severely damaged and individuals might try to reestablish pre-disaster capital stocks. This can happen through efforts to repair damages to houses, work materials and other

possessions that an individual considers to be of significant relevance to their everyday living. Efforts to increase those facets of capital in the aftermath of an destructive event might therefore lead individuals to allocate their resources more towards recovery than towards other aspects, like altruistic and trusting behavior. Therefore, the hypothesis that natural disasters alter the fundamental way in which people interact with their social environment does not seem far fetched. Furthermore, destructive disasters also play an important role in the emotional sphere of individuals, although the occurrence of negative or positive feelings towards fellow villagers and/or government/NGO officials might be very context specific and highly depend on the perceived success of recovery support and the perception of pro- and antisocial behavior of other stakeholders.

A case study by Rodriguez et al. (2006) takes a closer look at the behavior of victims of hurricane Katrina, which happened in 2005. In their article they say that: "The imagery that spread around the world, through the electronic media in particular, was of a state of anarchy; chaos; disorganization; regression to animal-like behavior and a total collapse of social control, agencies, and personnel... The various social systems and the people in them rose to the demanding challenges of a catastrophe. The behaviors were overwhelmingly prosocial, making the antisocial behavior seem relatively minor in terms of frequency and significance." (Rodriguez et al., 2006, p.83 & p.99) They also make implications about the understanding of pro-sociality in general by pointing out several cases where behavior can not per se be categorized into being "prosocial" or "antisocial". For example they reported locals breaking into empty houses (presumably left by citizens that evacuated before the disaster hit) to provide the needy population of victims with essential consumer goods. From the perspective of the owners of those houses this might very reasonably be considered as antisocial behavior, whereas the needy that were provided with those goods might perceive the plunderers as saviors. Another example was mentioned where people formed armed groups that would not be hesitant from using force against plunderers. Again, from the perspective of a member of those armed groups it might be considered prosocial to defend vulnerable property, whereas people in need of goods might have little understanding why someone would protect an empty house which harbored desperately needed goods. All the same, we can see that the long term adaption of an individual that experiences these extreme and unusual circumstances might highly depend on the individual perception of the pro-sociality of actions and responses of other stakeholders.

A study by Whitt and Wilson (2007) looks at the behavior of 352 Hurricane Katrina

Evacuees few weeks after the disaster. They recruited their sample out of the population of certain Houston-area evacuation centers that harbored refugees that fled from the crisis. Although they do not directly compare affected and non-affected individuals, their findings still have some interesting implications. For example, they find that their observed part of the population is not behaving substantially different in standard public goods and dictator games than participants from previous studies, where participants mainly consisted of students. However, they also find that a main driver for transfers in the games was if participants were still missing family members at the time the experiments were conducted. Transfers in the public good game were lower when an individual was still unsure about the whereabouts of close family members and a large part of contributions was explained by that factor, which implies that people adapt their behavior according to their emotional circumstances. This finding was true both for individuals that were categorized through the dictator game to be egoists or altruists.

Castillo and Carter (2011, forthcoming) measure disaster exposure by measuring monthly precipitation rates while hurricane Mitch passed through Honduras. By playing a dictator game and trust game with local villagers, they explore differences in experimental behavior that can be attributed to differences in precipitation rates. Their experimental sessions were held three years after the Hurricane, which occurred in 1998. By exploratively looking at their data, they expose a possible non-linear relationship between disaster exposure and transfers in the trust-game from senders and receivers. Their results suggest that (reciprocal) trust might be increased due to a shock, but a shock too large might cause an opposite effect.

Fleming et al. (2011) compare trust and trust-worthiness in villages that were either affected or not affected by an earthquake in Chile in 2010. They find no significant differences of trust-level between affected and not affected villages, they find however significant differences in trustworthiness.

Li et al. (2013) conducted experiments with children where they elicit altruism through playing a dictator game before and after an earthquake in China. They find that disasters positively influence transfers of nine year old children while decreasing altruistic giving of six year old children in the short term, but the authors find no evidence for long lasting effects of disasters on altruistic giving.

Ahsan (2014) compare the behavior of affected and unaffected Farmers in a trust game and experimental risk task one year after cyclone "Aila", which occurred in Bangladesh in 2009. They find that farmers who were exposed to the cyclone behave more risk averse, but do not find any correlation between sending behavior

in the trust game or the cyclone.

An additional study by Becchetti et al. (2017) looks at giving and expected giving in dictator games by micro-finance borrowers in Sri Lanka, seven years after a major tsunami that hit the country in 2004. They compare individuals which stated to have suffered some kind of destruction due to the disaster and compare them to individuals, who claimed to have been unharmed by the tsunami. Their results show that individuals who claimed to have suffered damages due to the tsunami give less and also expect less giving than unharmed individuals. They also find that disaster aid is positively correlated with giving for individuals that suffered relatively high damages.

2.4.2 Risk preferences

In Economics, experimentally measured risk preferences are well known proxies for the willingness to engage in risky investment decisions and are thereby often associated with financial success, not only because it is well established that wealth, income growth and low levels of income uncertainty are generally shown to be positively correlated with risk seeking behavior (Riley Jr and Chow, 1992; Shaw, 1996; Guiso and Paiella, 2008; Tanaka et al., 2010). Also, risk-preferences are often associated with the willingness to engage in formal insurance. From a theoretical point of view, it remains unclear whether risk preferences change in a particular way as a response to natural disasters. This is a result of different channels that might increase or decrease individual risk aversion. Gollier and Pratt (1996) for example model that an increase in an unfair background risk might lead risk vulnerable individuals to behave more risk averse. Since people are expected to update their perception of the likelihood of the occurrence of some risk directly after such a dramatic event, the alteration in risk preferences depends on the perceived increase or decrease in background risk. Although theoretically possible that perceived background risk decreases after severe shocks, studies show that being exposed to a disaster is usually highly correlated with higher perceptions of background risk (Cameron and Shah, 2015; Samphantharak and Chantarat, 2015). From prospect theory (Tversky and Kahneman, 1974; Kanehman and Tversky, 1979) we can deduct that another direction of effect seems plausible, where individuals use their own reference point in wealth as a comparative mark for their situation after they experienced a severe loss. Since according to Tversky and Kahneman (1974) reference points need a substantial amount of time to adjust to new circumstances, people tend to be in a loss frame and might therefore be more willing to take a risky gamble (Tversky and Kahneman, 1981).

A study that looks more at the short term influence of natural disasters on risk preferences was done by Eckel et al. (2009), although the effect of the natural disaster was only discussed secondary[6]. Eckel et al. (2009) use Bayesian network formation to explain the link between certain emotions and behavior in a simple risk task (Eckel and Grossman, 2002, 2008). Their sample consists of two cross-sectional waves: hurricane Katrina evacuees shortly after the storm, and one additional wave of observations about one month later. The authors thereby unveil a possible relation between (what they call) "positive emotions", like being alert and determined, and risk aversion. Therefore the authors conclude that, since positive emotions are less likely to be prevalent after experiencing a devastating natural disaster, it is very likely that risk aversion decreases shortly after such an event. They also observe that in their second wave of observations, ten months after the hurricane, risk preferences from the hurricane Katrina evacuee sample highly resemble those from a sample of local Houstonians.

Van Den Berg et al. (2009) conducted a study in Nicaragua after hurricane Mitch which occurred in 1998 and devastated vast parts of Central America, especially Nicaragua and Honduras. They interviewed 222 farmers, whereas 131 were highly affected by the hurricane, 51 mildly affected, and 40 from resettlement areas. By using willingness-to-pay survey items for hypothetical lotteries and actual experimental risk games they elicit risk preferences and compare the outcome between the three groups. They use a similar approach in Peru with 100 farmers, looking at the correlation between past experienced natural hazards and risk aversion. From the results of their analysis they observe a positive correlation between risk aversion and experienced damages from natural hazards four years after the event.

A more simplistic approach to measure risky behavior by Page et al. (2012) was to give Australian homeowners a binary choice between a lottery scratch card and a sure amount of money, shortly after some of them experienced damages because of major floods in 2011. They observe that homeowners who frequently experienced losses in terms of damages to their house are more likely to accept the risky scratch card instead of a sure amount of money. Hence the authors attribute their finding to a slow readjustment of the reference point in income, which leads to a loss-frame. According to prospect theory, this should lead to an increase in risky behavior, or as Tversky and Kahneman (1974) put it: "... [a] person who has not made peace with his losses is likely to accept gambles that

[6]The primary focus of this study was to determine gender effects on risk preferences. Nevertheless the study has some interesting implications on the effect of natural disasters on risk preferences.

would be unacceptable to him otherwise" (Tversky and Kahneman, 1974, p. 287).

Cameron and Shah (2015) use a risk elicitation method similar to Binswanger (1980) and compare their results between individuals that recently suffered from natural disasters and individuals that did not. They conducted their study in Indonesia with about 1,550 individuals across East Java, using key informant interview data and seismic data to measure the frequency, intensity of damages, and the distance to epicenters of natural disasters. They find that individuals that were recently exposed to disasters behave more risk averse in their experiment than individuals which were not. They ascribe their finding mainly to an updating process, which increases the perception of the likelihood of an additional natural disaster after one just occurred.

A survey conducted by Samphantharak and Chantarat (2015) uses hypothetical risk preferences and compares households that experienced a devastating flood with households that were not directly affected by the flood in 2011 in Thailand. They also find evidence for background risk updating after a devastating event and reported higher risk aversion in households that were directly affected.

One study by Kahsay and Osberghaus (2016) also uses panel data from a German phone survey and looks on the effect of storms on hypothetical risk preferences. They find that risk aversion decreases after a storm and that it is not enough to experience the storm per se to receive influences on behavior, but also damages have to result from the storm to be behaviorally relevant.

An additional study by Cassar et al. (2017) looks at choices between two lotteries of villagers from a cross-section of villages which were affected and non-affected by a major tsunami in Thailand in 2004. Five years later, they conduct experiments with 334 local villagers and follow a protocol closely to Andersen et al. (2008), which is an adaptation of the Holt and Laury Risk-task (Holt and Laury, 2002). The authors find evidence for higher risk aversion of individuals that stem from affected villages, compared to villages from unaffected villages.

Another study by indicates that residents of houses with multiple levels update their perceived background risk since they observe higher relative prices for apartments that lie on lower levels several months after the Wenchuan earthquake in 2008. The relative prices however bounce back to their initial levels after about three months, indicating that the updating of perceived background risk is rather short termed.

2.5 Research question & hypotheses

The central aim of this thesis consists on the focus on two questions. 1.:"What form of the measured forms of capital helped households/individuals most to recover from the effects of Yolanda?"; and 2.:"Did Yolanda change pro-social behavior, individual risk preferences and/or forms of capital?" Therefore the aim of this thesis is to give an example of how to apply the framework which I developed in section 2.2 and to see whether the attributed causal channels hold if they are tested in an empirical setting. Due to technical limitations, I can only try to answer these questions in some regards and also have to make elementary assumptions about the nature about the data which was collected in the Philippines. I will discuss the validity of these assumptions further in chapter 6. More details about the experimental structure and methods of the study can be found in chapter 3.

First and foremost, I assume Yolanda is an exogenous shock that was in no way caused or foreseen (in the long term) by the individuals living on the island of Panay. I have several reasons to believe in this assumption. Anecdotal evidence from key informants (barangay captains and municipal officers) as well as experimental participants show that the path and the strength of Yolanda was rather unexpected. Participants also repeatedly said that they were completely taken by surprise and overwhelmed by Yolanda. These claims were supported by data from meteorological recordings which show that Panay is relatively less prone to tropical typhoons than northern parts of the Philippines (Manila Observatory, 2005; Kitamoto, 2018). Our survey data also shows that 94% of our participants were within their village when the disaster made landfall, and that the average time before people knew that Yolanda would make landfall was about 7.5 hours, which indicates that the average individual was not able to foresee the event.

My second assumption is that key village characteristics, such as village size, the endowment with infrastructure, ecosystem services, and general way of living do not substantially differ from village to village. This was partly ensured by randomizing villages from a subset of villages which had to fulfill certain criteria (see section 3.1 for more details). This is fundamentally why I assume that natural, as well as physical capital endowment on the community level (such as disaster mitigation measures) are rather similar between villages and therefore I assume physical and natural capital endowment to be rather homogenous across villages. As a consequence, this study is not able to derive any effects of community physical or natural capital on disaster resilience.

The third assumption relies on the experimental nature of this study. This means that I assume that Yolanda was the only shock which influenced the villages under

observation in different ways. Hence I assume that there were no shocks between 2012 and 2016 which could distort the results from this study in any way. After more thorough investigation, there was one typhoon that made landfall on Panay one year before typhoon Yolanda, typhoon Wukong. However, this typhoon was not comparable to Yolanda, since the damages it caused were about 0.25% of the damages Yolanda caused, and it reached maximum wind speeds of 75kmh, whereas Yolanda reached wind speeds up to 380kmh. The exceptional strength of Yolanda has already been shown in subsection 1.2.2. Therefore, the results I am going to present later could be biased by this additional shock. However, I believe that the difference in the level of intensity is substantial, such that the effects of Wukong can be neglected. But since the path of Wukong was similar to Yolanda (making landfall in the north of Panay and moving westward), any effects I find later could still be slightly biased.

Under the consideration of these assumptions I am now able to formulate hypotheses which are tested in this thesis. Integrating the findings from the literature and with respect to theory, the first block of hypotheses (H1a-H3c) deals with the question whether or not theoretical predictions of causal linkages between different forms of capital and elements of disaster resilience hold if we test them empirically. Due to the technical limitations of this study I am not able to test the effects of village level natural and physical capital on disaster resilience since both dimensions of the framework are assumed to be homogenous across villages. Therefore the first block of hypotheses tests if there is a direct link between endowment with human, financial, or social capital and aspects of disaster resilience. The second block of hypotheses investigates effects of exposure to typhoon Yolanda on different forms of capital and aspects of human behavior, namely experimentally measured risk- and social preferences (H5a-H8a). Furthermore I investigate whether intuitive elements of the previously constructed framework hold, such as the claim that more affected individuals usually receive more aid and need more time and money to recover (H4a-H4c). In section 4.4 I will talk more about how I construct indexes and which proxies I use for different forms of capital, as well as other variable of interest. The next chapter of this thesis contains more information about the applied Methods of this study and should provide further information to shed light on how this study was conducted in detail.

Table 2.1: Respective testable hypotheses of this study

hypothesis	related literature
1. The relation between different forms of capital and disaster resilience	
Human capital (Figure 2.7)	
H1a: Human capital is negatively correlated with recovery time and recovery costs.	(cf. Wamsler et al., 2012; Muttarak and Pothisiri, 2013; Frankenberg et al., 2013)
H1b: Human capital is positively correlated with the distance between the time individuals heard about Yolanda making landfall and its respective time of impact.	(cf. Drabek, 2013; Sharma et al., 2013)
Social Capital (Figure 2.9)	
H2a: Social capital is positively correlated with the amount of aid an individual received.	(cf. Granovetter, 1983; Hawkins and Maurer, 2009; Aldrich, 2012b)
H2b: Social capital is positively correlated with the distance between the time individuals heard about Yolanda making landfall and its respective time of impact.	(cf. Aldrich, 2012b; Drabek, 2013)
H2c: Social capital is negatively correlated with recovery time and recovery costs.	(cf. Granovetter, 1983; Nakagawa and Shaw, 2004; Aldrich, 2012b)
Financial capital (Figure 2.10)	
H3a: Financial capital is negatively correlated with recovery time and positively with recovery costs	(cf. Clarke and Wallsten, 2003; Skoufias, 2003; Carter et al., 2007; Skoufias, 2007; Macours et al., 2012, 2013; Le Quesne et al., 2017)
H3b: Financial capital is positively correlated with the distance between the time individuals heard about Yolanda making landfall and its respective time of impact.	(cf. Mark and Semaan, 2008; Mark et al., 2009)
2. The relation between disaster exposure, different forms of capital, and human behavior	
Damages, help & recovery (Figure 2.13)	
H4a: More exposed individuals received more help after the disaster.	
H4b: More exposed individuals suffered higher structural damages.	
H4c: More exposed individuals have higher recovery costs and recovery time.	
Human capital (Figure 2.13)	
H5a: Human capital declines over time due to disaster exposure.	(cf. Baez et al., 2010)
Social capital (Figure 2.13)	
H6a: Social capital declines due to disaster exposure.	(cf. Rodriguez et al., 2006; Whitt and Wilson, 2007; Castillo and Carter, 2011; Fleming et al., 2011; Li et al., 2013; Becchetti et al., 2017)
Financial capital (Figure 2.13)	
H7a: Disaster exposure leads to less financial capital.	(cf. Benson and Clay, 2004; Kousky, 2014)
Risk preferences (outside the scope of the framework)	
H8a: Disaster exposure increases risk aversion.	(cf. Eckel et al., 2009; Van Den Berg et al., 2009; Page et al., 2012; Cameron and Shah, 2015; Samphantharak and Chantarat, 2015; Kahsay and Osberghaus, 2016; Cassar et al., 2017)

3. Methods

This chapter is dedicated to describe the methods and experimental setting which we apply in more detail. I begin by providing a short summary of the whole study and continue by showing how we selected our participants and describing the experimental setting precisely. A bigger part of this chapter is dedicated to the different experimental and non-experimental methods which we use, hence it provides a detailed overview of all of our applied instruments to obtain data. After reading this chapter it will be clear how the applications of the different tools were done and therefore it should be comprehensible to the reader how to replicate this study.

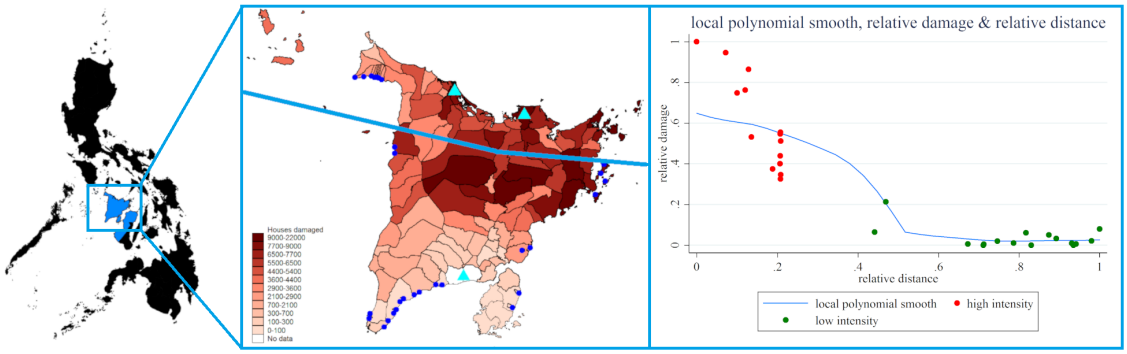


Figure 3.1: Study site: part (A) shows the location of Region VI (western Visayas) on the Philippines; part (B) shows the path of Yolanda in blue and the respective damaged households per municipality; part (C) shows the relation between the minimum distance from the eye of the storm and the share of destroyed households in a community; ((data from: PhilGIS, 2017; Kitamoto, 2018)

We take advantage of a natural experimental setting comparing the behavior of lowly affected and highly affected villagers both before and after typhoon Yolanda. Our study took place in two time periods (summer 2012 and summer 2016[1]). The study site was the Island of Panay, which is located in the Western Visayas (Region VI) in the Philippines. Figure 3.1 shows the Island where our research was conducted with the respective number of damaged households that were either partially or totally damaged by typhoon Yolanda on the municipality level. The blue dots represent the location of the villages where we executed our experimental workshops. The blue line represents the track of the typhoon according to GPS data (Kitamoto, 2018). We can clearly see the potential for an experimental setting when we look at the high discrepancy between the damaged households between the North of the Island and the South. Concerning our selected villages however, this discrepancy does not arise from differences in population density. On Panay, there are three major cities: Iloilo-city, Kalibo and Roxas , but the coastal villages where we conducted our experiments were all comparable in size and population density and had all quite similar village characteristics. Villages were selected randomly from a pool of pairs of coastal villages, where a pair would consist of a village which has a marine protected area (MPA) and a village which has not. The aim of the study in 2012 was to derive effects of marine protected areas on the social cohesion of communities, and therefore there were no intentions to relate the collected data to the effects of the typhoon in the beginning, since we could not foresee this major event. Therefore we are not able to provide pre-analysis plans to the reader, since we were - just as our participants - completely taken by surprise by the occurrence of Yolanda. All of the applied surveys, protocols, and decision sheets can be found in the Appendix.

3.1 Sample selection

The first study which was conducted in 2012 was led by Karla Henning under the supervision of Björn Vollan and Andreas Landmann, who followed a sampling procedure very close to Landmann et al. (2012), who also conducted an experiment on the same island. The first experiments were conducted in the Western Visayas (Region VI), in the provinces of Antique, Guimaras and Iloilo in 2012, whereas a two-staged random sampling procedure was applied. First, they randomly determined the experimental sites, and then they drew participants within the selected barangay (lowest administrative level on the Philippines and often com-

[1] Table A2.1 which shows a timetable of when and where the study was conducted can be found in the Appendix

parable to a village regarding size and structure). They randomly selected pairs of neighboring coastal villages where one village was known to have implemented a marine protected area, and the neighboring village had not. The target population consists of low-income households in rural areas. They therefore drew a random sample of 15 barangay pairs whereby municipalities from the first income class (high income) and urban locations were excluded from the sampling process. Also very small (population below 500) and very big (population higher than 3,500) barangays were not considered in order to make the sample more homogenous and stratified. Permission of the punong barangay (elected village representative, or mayor) to conduct the research was obtained in all barangays. They, as well as us, made all possible efforts to visit also remote locations, and all 30 locations of the sample could be reached in the end. In the second sampling stage, the households were randomly chosen within a barangay. Their and our recruiters went to the location some days prior to the experiments, asked the barangay officials for permission to run the experiments, ensured the availability of facilities for the games and requested a list of households from which nine households were randomly selected. The recruiters then noted the names of the nine households and handed out invitation letters to someone who was from the household and available at the time, preferably the household head. They also received instructions to invite two close friends or relatives from different households. In 2016, our main effort was to re-invite the very same persons that participated in 2012. Whenever someone was not available or able to show up, we would simply replace him or her with another person from the barangay which was available at the time (appearing in the unbalanced part of the panel). Therefore, we were able to collect data of ~ 810 individuals each year, whereas 449 of which were present in both years.

3.2 Workshop structure and location

This section describes the locations where we held our workshops and provides a detailed overview about the structure of each session. We held 30 workshops with experimental games in different barangays each year which were held in the same manner in both years. However, we extended our workshops in the second wave (2016) by focus group discussions and key informant interviews. Figure 3.2 shows a graphical representation of the workshop structure and the respective games that were used in the experimental session for each year. Before we conducted our workshops in each village, a team of assistants was sent to scout for possible ground where we would be able to conduct our workshop. There are mainly three

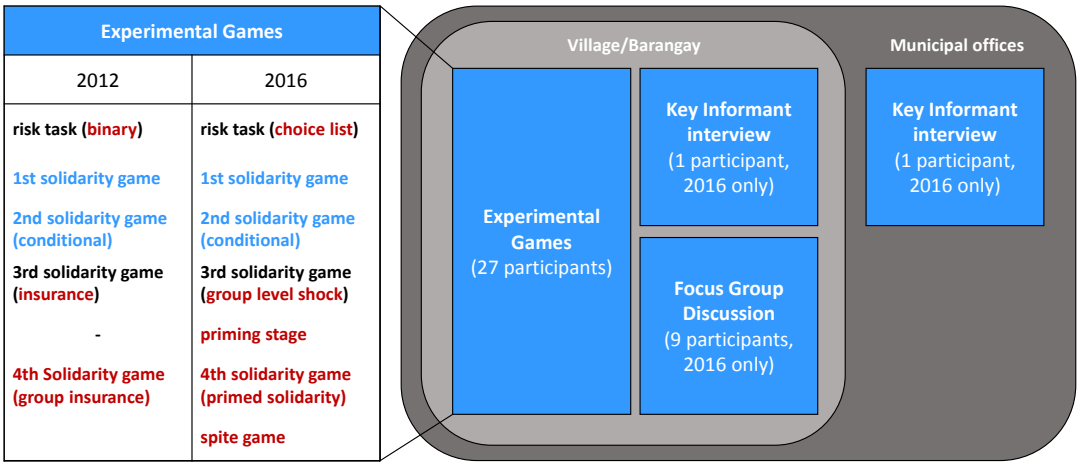


Figure 3.2: Workshop structure: experimental games played

kinds of locations which can be found in almost every village and which we could use for the conduction of our sessions, namely: chapels, schools and/or daycare centers, and roofed basketball courts. One of the more challenging tasks was to ensure the well-being of our participants during our sessions, since our workshop was conducted around lunchtime and daily temperatures were quite high.

At the time we were on Panay, the average temperatures in the Philippines were about 33°C and access to comfortable air conditioned areas, like labs in universities, was not feasible. Although these temperatures are normal in the Philippines and locals are used to have temperatures above 33°C, we still made sure that each session was provided with chairs, shadow (ideally fans as well), and cold drinks and snacks that were served after the experiments were held. The first contact to our participants occurred through our recruiters which formally invited[2] participants to the place where our workshops were held two weeks before the workshops actually began. Workshops would start at 12:30pm according to the invitation letter. However, since punctuality is seemingly not a commonly distributed trait in the areas where we operated, we sometimes had to wait until everybody arrived to the workshop and push our schedule a bit to the back[3]. Every participant was welcomed by an assistant who led the participant to another research assistant responsible for reception.

Each participant was equipped with an identification badge which had a number

[2]Formal invitation letters can be found in section A16 in the Appendix.

[3]Therefore, workshops would usually start at 1:00pm, sometimes even at 3:00pm. However, we made sure that we surveyed and paid out the participants first who also arrived first to the workshop such that they could leave a bit earlier.

between 11-93 on it[4]. Seats were marked accordingly and the participants were led to their designated seats and an assistant conducted a pre-experimental survey as soon as the participant took his/her seat (see sections A3 and A6 in the Appendix). We let all groups of three which arrived to our workshop sit together in one row. We began when all seats were occupied by a participant and everyone of them had conducted the pre-experimental survey. We also recorded who arrived first to the session to have some sort of prioritization for the post-experimental survey. We applied this first-come first-serve approach to make sure that each participant spent about the same time at the workshop and to avoid frustration, since the workshops had a minimum length of two and a half hours. Additionally, not all participants arrived on time, which meant that some individuals had to wait a substantial amount of time in their seats (up to two hours) before the session began. We began the experimental games only after all seats were taken in 2016, whereas this was not in all cases possible in 2012 and therefore we played with less individuals in some villages in 2012.

Each session was moderated by one assistant who followed and read the protocol (see sections A5 and A11 in the Appendix) to the participants in local language. Each group of three people was accompanied by one assistant who was responsible for recording survey-answers and experimental-decisions. Surveys were conducted via pen and paper in 2012, and via using the tablet application KoBo-Collect in 2016. The Experimental session began by welcoming all the participants to the workshop and by explaining some ground rules which everybody in the workshop had to follow. We made clear that communication with other participants was forbidden until the workshop ended and that we would not hesitate from excluding participants from the workshop if we caught them disobeying the rules[5]. We then led them through the program of the workshop which was strictly orchestrated by the experimental protocol for each year (see Appendix). When participants had to conduct a survey or make a decision in a game, the designated assistant would bring the participant to a close-by area where they could not be heard by other participants, making sure that the decision of each participant was only audible and visible to the designated assistant. We chose this kind of procedure to avoid problems with illiteracy and to make sure, that all questions

[4] We put 9×3 rows of chairs onto an open area. Each row of three chairs was marked with a unique decade digit (1-9) which indicated the group identification number. The unit digit indicated the player identification number within that group (1-3). The participant identification number therefore consisted of a combination of those two and was $\in \{11, 12, 13, 21, 22, 23, 31, 32, 33, 41, 42, 43, 51, 52, 53, 61, 62, 63, 71, 72, 73, 81, 82, 83, 91, 92, 93\}$.

[5] Although we never had to exclude participants for disobeying. Sometimes we had to admonish some participants, but after that they would follow the rules for the rest of the workshop.

were answered (c.f. Cardenas and Carpenter, 2008). The structure of experimental workshops was quite similar in both years, with some mentionable differences (see Figure 3.2). Each Session began with a risk preference elicitation task. In 2012 it was a simple choice between two lotteries with a 50-50 chance to win either a high price (medium price), or a low price (or nothing at all), whereas we used elicitation of certainty equivalents in 2016[6]. The risk game was followed by a series of solidarity games[7]. We made clear that only one game would be payoff relevant in the end with an equal chance to be selected.

Figure 3.2 shows the differences between the two waves of observations with regard to the experimental workshop structure in red. As we can see, the first and second solidarity game were conducted identically in both years, whereas there are some mentionable differences between the third and fourth solidarity game (see protocol for details). For example we introduced a priming stage in the second workshop in 2016 where we activated the minds and attention of our participants regarding the behavior of individuals during and after Yolanda using targeted survey questions (see sections A7, A8 and A9 in the Appendix). The session in 2012 would end with an additional solidarity game, whereas the session in 2016 ended with a joy of destruction game (spite game; (Abbink and Sadrieh, 2009)).

As soon as one game had ended, assistants would bring the decision sheets to a visually separated area for recording. After all games were finished, we would decide which game was payoff relevant by using an opaque bag with a number of balls in it which corresponded to the number of games that we have played. We showed that the bag was empty and put the numerated balls into the bag in front of our participants eyes. We then chose the participant with the ID tag 11 to draw a ball from the bag. The number on the ball would decide which game was payoff relevant. After that, we would continue by following the protocol, depending on what game has been selected to be payoff relevant (for details see the protocol in section A5 and A11 in the Appendix). After this procedure, participants would be asked by an assistant to follow them to a remote area where they would take the post-experimental survey.

When participants were finished with answering post experimental survey questions, the assistant would lead the participant to the payout area, which was visually separated from the other participants. They were given their earnings plus a show up fee of $100PHP$ in a roll of paper, such that it could not be seen from the outside how much money was inside the roll. We also asked participants

[6]More on the Risk elicitation tasks in both years in section 3.3.2.
[7]More on solidarity games in section 3.3.1

at this point to please hide the roll of paper which contains their earnings and the show up fee in their pockets, such that other participants cannot induce the amount of money from the size of the roll and therefore make any suspicion about their behavior in the games. Because of time constraints, we refrained from debriefing participants.

3.3 Experimental tools

In order to be able to answer all of our raised questions regarding the adverse impacts of natural disasters and capital forms on disaster resilience and respective changes of these traits, we made use of quite a multilateral toolbox for experimental economics. This section is dedicated to introduce all of the methods we applied in the field to attain data and which are relevant to investigate the hypotheses raised in section 2.5. Some of them are rather popular in behavioral science (e.g. incentivized games) and some of them are rather unusual to be found in behavioral studies (e.g. time-line and other PRA tools which are part of the focus group discussions). I begin by introducing the experimental games we used in both years, followed by an explanation of the focus group discussions and the survey questions which we used. I also want to seize the opportunity to clarify the origin of each tool and how our application was conducted and to discuss potential unique properties of our applications. In the end of this section I will also provide a broader explanation of the origin of other data that we used, like census data or geographic GIS-data (e.g. GPS data for the track of the typhoon).

3.3.1 Solidarity game

The experimental solidarity game was first introduced by Selten and Ockenfels (1998). They played it with students from a German university in a double blind setting. The game is played by three players who start with the same initial endowment, and a random process then decides for each player if they can keep their endowment or not. Before this random procedure, each player has to state whether and how much they want to transfer to one losing player or two loosing players, with the possibility to discriminate between the two losing players, in case they themselves can keep their endowment. The height of their transfer indicates the level of solidarity. The solidarity game is therefore similar to the dictator game (Forsythe et al., 1994; Hoffman et al., 1994), except that it is played by three players and that the recipient is decided by a random process after the transfer decisions have been made.

Our application of the solidarity game is a slight alteration of the version presented by Selten and Ockenfels (1998). The game consists of three players and in our case where two of the players knew each other quite well, since they were either close friends or relatives by design. However, those two persons did not know who the third player in their group was, since we randomly decided group compositions using a random generator beforehand. Respectively, the third person had no clue about the identity of the other two group members as well. Therefore we are able to distinguish between slight in-group and out-group behavior in this game. Each player starts with the same endowment in the beginning, namely 200 Philippine pesos. According to our surveys, this amount corresponded to an approximate 150% daily income in 2012, and 105% daily income in 2016.

A simple random process decides which of the three players loses all of the initial endowment and is left with no money at all. This random outcome was decided by drawing balls from an opaque bag, which contained one red ball and two white balls. If the solidarity game was randomly chosen to be pay out relevant in the end, we would let each of the two players knowing each other draw one ball from the same bag after all of the experiments had ended. If none of them drew a red ball, it was clear that the anonymous player in the group was the one who had lost all of the initial endowment. Therefore the draw of the two first non-anonymous players automatically decided the outcome for the third player. This ensured that even after the games had ended, the two players did not know who had played with them in their group and vice versa, ensuring the anonymity of the third player. The actual decision each player had to make was how much they would transfer to the losing player, in case that they would draw a white ball. Additionally, each player had to guess the height of the transfer of the other players, in case that they themselves would draw a red ball. transfers and guesses were able to be made between zero and seventy pesos in steps of ten. Therefore transfers and guesses that were allowed were $\in \{0, 10, 20, 30, 40, 50, 60, 70\}$. We decided to introduce the upper bound of seventy Philippine pesos to exclude the possibility that the player who drew the red ball was able to be better off in the end than the respective "winners".

Therefore our adaptation of the game shows some mentionable differences from the initial solidarity game which was conducted by Selten and Ockenfels (1998). First, we adapt the game in a field and not in a lab setting, in hope of heightening the validity of our outcomes and to be able to put them into a non-student context. Second, our random procedure excludes the occasion where none, or two or more players lose their endowment. Hence our groups always end up with one

"loser" and two winning players by design. Third, we do not adapt a double blind procedure, which means that the transfer decision and guesses were told to one of our assistants who made sure, that the decision of the serviced player was not visible to other players from the respective village.
We had two different variants of the solidarity game. One where we only asked about transfers and beliefs as described above. The second variant also asked about conditional transfers of each player, meaning that we obtained a transfer structure for each player conditional on the transfer decision of the other player[8]. This procedure is helpful to attain information about reciprocal behavior in the solidarity game and to classify individuals into groups of egoist, altruists, conditional givers, and other types. The classification follows the same procedure of Fischbacher et al. (2001). Both applications of the game were identical in both years.

3.3.2 Risk task

Eliciting risk preferences in the field can be challenging since the outcome may vary with the instrument that is used. This is mainly because traditional applications of risk tasks in laboratories are usually perceived as unintuitive. Although a sample of university students is usually capable of understanding such complex tasks, the very same tasks may be not well applicable in the field. For example, classical adaptations of the Holt and Laury risk task (Holt and Laury, 2002), which are popularly used in lab experiments with students, have shown to deliver high rates of inconsistencies in field experiments (Lönnqvist et al., 2015; Charness and Viceisza, 2012). Therefore we adapt a simpler procedure which always gives a choice between two assets. The procedures vary between the years 2012 and 2016. In 2012 we adapted a simple binary choice between two risky assets, similar to Eckel and Grossman (2002) and Eckel and Grossman (2008). However, our application of the risk task only offered a choice between two assets instead of five, making it less complex. Every participant started with 200 Philippine pesos and played the same lottery once. The lottery itself offered a two third chance of keeping a high amount of money and a one third chance of keeping a low amount of money. Before the outcome of the lottery was decided, we offered two different outcomes to each player. The first option (option A) offered the player a two third chance to keep the 200 pesos of the initial endowment, whereas there was a one third chance that the player looses all of of the 200 Philippine pesos. The second

[8] Or to put in a bit less complicated words: We asked each player: "How much are you willing to transfer to the other player if he/she loses, and you know that he would give you x if you lose." Where x is again $\in \{0, 10, 20, 30, 40, 50, 60, 70\}$.

option (option B) offered the player an "insurance" (during the instructions it was not directly framed as insurance). Option B allowed each player to pay 40 Philippine pesos to ensure a payoff of 100 pesos in case they lose in the lottery, which means there was a two third chance to keep 160 Philippine pesos, whereas there was a one third chance that the player could keep 60 pesos. Therefore the expected value of the second option was higher and should be preferred by rational actors. However, option A offered a chance of higher winnings, which risk-neutral and risk-seeking individuals might prefer. We let each player from the session draw from the same opaque bag which contained 18 white balls and nine red balls. Therefore, two third of the session would end this task as "winners" and one third as "loosers".

The risk preference elicitation task in 2016 differed from the procedure in 2012 by using a more precise approach by apprehending certainty equivalents (Tversky and Kahneman, 1992; Bruhin et al., 2010; Abdellaoui et al., 2011), which was also very similar to the approach of Van Den Berg et al. (2009). We followed a protocol very similar to Vieider et al. (2016), who attain certainty equivalents in experiments in Ethiopia. We played three consecutive lotteries with a 50:50 chance of winning a high/low amount of money. For each lottery, we gave each individual the choice between playing the lottery, or receiving a fixed amount of money instead. Using the strategy method, we asked individuals to make multiple decisions regarding their preference for lotteries or varying fixed amounts. Although each individual had to make a decision for each possible fixed amount we offered, the height of the fixed amount that was actually payoff relevant was determined by a random procedure, selecting one fixed amount out of every amount between the low and high payoff in steps of five pesos.

Table 3.1: Lotteries played in both waves of observation

	2012		2016		
	Lottery 1	Lottery 2	Lottery 1	Lottery 2	Lottery 3
High payoff	200PHP	160PHP	100PHP	200PHP	200PHP
Low payoff	0PHP	60PHP	40PHP	80PHP	140PHP
Chances of winning high amount	66.6%	66.6%	50.0%	50.0%	50.0%
Possible fixed amounts	-	-	$\in [45, 95]$, steps of five	$\in [85, 195]$, steps of five	$\in [145, 195]$, steps of five

If the risk task was chosen to be paid out in the end, a player from the session would draw a ball from an opaque bag. The bag contained three balls with the numbers 1-3 written on them. Therefore, the ball the participant drew decided

which lottery would be payoff relevant. After this was determined, a random generator[9] decided which certainty equivalent was applied. This procedure mainly has the advantage of delivering more precise values for risk preferences while keeping the task itself simple and applicable in areas with low literacy rates (Vieider et al., 2016). Therefore we decided to implement this procedure in the second wave of our experiments to attain more information about risk seeking behavior after the severe typhoon.

The implementation of the second procedure has some methodological implications which we should mention at this point. Our aim still is to compare risk-seeking behavior before and after the storm between low intensity and high intensity areas. However, both procedures are distinct from each other in some important aspects, which should be taken into account when interpreting the results. First and foremost, the risk task in the first wave was framed in the loss frame, while the risk task in 2016 was framed in the gain domain. This could cause some severe differences between behavior in both sessions since there is sufficient experimental evidence that people tend to be more risk seeking in the loss-domain (Kühberger, 1998). Secondly, to be able to compare both outcomes we have to apply similar measures for both years. Since the outcome for the first year is binary, we have to interpret the outcomes of the second wave to be binary as well. Therefore we defined individuals to be "rather risk neutral/seeking" if their average risk premium across all lotteries was larger than zero. Thirdly, the approach in the second wave allows for erratic and inconsistent behavior. From the researchers perspective, it does not make sense to switch multiple times from preferring the lottery or the certain amount. A subject with clear preferences should only switch once or not at all. Therefore we excluded all observations that gave us hints about erratic behavior by switching multiple times between the certain amount and the lottery. Hence we obtain more observations in the first wave than in the second wave because we were not able to check for erratic behavior, which we consider to be an advantage of the second approach because we can be more certain that the individuals who did not fail our criteria of single switching understood the task.

3.3.3 Focus group discussions

As our workshops also included focus group discussions, we have more qualitative data on the whole process individuals went through because of Yolanda. This

[9] We would simply assign a random number between zero and one to each fixed amount of money. The highest random number would decide the certainty equivalent that is relevant for the participant's payoff in the end.

workshop was held parallel to our experimental games and consisted of three randomly selected business owners, three randomly selected fishermen, and three randomly selected villagers without having a certain occupation[10] per village, which therefore results in a total number of 270 participants. The workshops were held in a more interactive atmosphere and was led by two master students who wrote their thesis on topics that were related to the Philippine study in general. The workshop consisted of an incentivized guessing game, where participants had to try to predict the average behavior of certain groups in the experimental games. The guessing game was then followed by some PRA tools (c.f. Cavestro, 2003), including a time-line, SWOT analysis, Venn diagram and a conflict matrix. The time line was constructed to visualize the development of certain variables of interest over time since the harvest season of 2103, which was shortly before Yolanda. Participants had to draw a line from the beginning of the harvest season until today and indicate for each month on a scale of minus three to plus three the relative condition of the variable of interest (for example average income in the village, or average solidarity). First, each group of three individuals (either three fishermen, three shop owners, or three random participants) had to decide on their own how the development looked like, accompanied by one of our research assistants. When time was up, all the groups had to agree on one chart that was constructed by each group which they find was most representative. They would find their decision in form of an open discussion which was lead by our research assistants as well.

Another tool we used in the frame of the focus group discussions was the conflict matrix, which indicated what kind of conflicts arose due to disaster relief and which made it possible to quantify the different types of conflict that arose during disaster relief efforts and therefore be able to get a feeling about their respective relative occurrence within a village. We offered several categories indicating with *whom* conflict occurred, and about *what* topic the conflict was about. The stakeholders which we offered were either household members from the same household of the interviewee, members from this village, villagers from neighboring villages, strangers, and state officials. The types of conflict we offered were conflicts about disaster relief goods in general (food, water..., etc.), financial aid, reconstruction and shelter, exclusion from aid, and lack of cooperation. Additionally villagers had the opportunity to add additional sources of conflict if they wished to do so. Additionally we offered participants of the experiments, as well

[10] But we would not allow village officials, since we did not want the other participants to feel pressured or led by the responses of kagawats (councellors) or punongs (mayors).

as participants of the focus group discussions a table where they could tell us how they wished beneficiary selection of disaster relief goods was done, and how it actually should be according to their own opinion. For more details about the focus group discussions see the whole respective protocol in section A12 in the Appendix.

3.4 Empirical strategy and methods

To elicit the relation between disaster resilience indicators and pre-capital endowment of individuals, as well as to elicit the causal relation between disaster exposure I use quite a substantial amount of statistical tools and procedures. First and foremost, I will be looking a lot at mean differences, both to get a better feeling about developments over time, but also about differences between high and low intensity villages. The type of hypothesis test which I use depends on the type of variable I am testing. For binary variable mean comparison between two independent groups I use Chi-squared tests (Pearson, 1900), to test for differences between means of two independent groups of continuous variables I use unpaired T-tests (Satterthwaite, 1946), and for ranks and scores (ordinal values) I use Mann-Whitney (Mann and Whitney, 1947) tests. Furthermore, when testing for equality of distributions between two independent groups I use a Kolmogorov-Smirnov test (Massey Jr, 1951).

I construct indices for different forms of capital using exploratory principal component and factor analysis where I make use of the substantial amount of data we have collected regarding aspects of human, social, financial, and physical capital (see section 4.4 for details). However, this study is not able to derive any effects of natural capital on disaster resilience since we applied a randomization protocol that only allowed similarly endowed households into our sample. Following this data reduction method I am using a simple OLS regression with robust standard errors of the form:

$$Res_{i2016} = \alpha + \beta_1 h_{i2012} + \beta_2 f_{i2012} + \beta_3 s_{i2012} + \beta_4 p_{i2012} + \beta_5 C_{i2012} + v_j + \epsilon \qquad (3.1)$$

Where $h_{i2012}, f_{i2012}, s_{i2012}$ and p_{i2012} represent indices which I construct through principal component or factor analysis for financial capital, human capital, social capital, or physical capital for individual i in the year 2012. Res_{i2016} represents indicators for disaster resilience, such as (1) the absolute number of days individuals needed to repair their houses, (2) the absolute amount of costs that are

associated with the damages that occurred on houses due to the typhoon, (3) the time individuals had between realizing that a strong tropical typhoon was incoming and actual landfall of the tropical cyclone, (4) individual perceived affectedness, (5) perceived help by external actors such as governmental or non-governmental institutions, and (6) perceived help from internal actors such as friends and neighbors of individual i in the year 2016. C_{i2012} represents a vector of control variables which include age, a dummy for gender and a dummy which indicates if the was single for the year 2012. Hence I take a look at the relation between different forms of capital in 2012 and resilience indicators in 2016. To control for heterogeneity in exogenous disaster exposure and other unobserved variables on the village level I use village fixed effects (v_j) by including dummies for each village j into the model.

Additionally I am taking a look at the explanatory power of the single components of capital indicators from 2012 on resilience indicators in 2016 and hence use also a model of the form:

$$Res_{i2016} = \alpha + \beta_1 H_{i2012} + \beta_2 F_{i2012} + \beta_3 S_{i2012} + \beta_4 P_{i2012} + \beta_5 C_{i2012} + v_i + \epsilon \qquad (3.2)$$

In equation 3.2, $H_{i2012}, F_{i2012}, S_{i2012}$ and P_{i2012} represent vectors of variables which are part of capital indicators or closely related to them. Human capital components used in this study are: (1) a dummy which indicates the highest educational attainment of an individual (high school, college, or vocational training using elementary scholars as a baseline), and (2) an index between zero and one that indicates the relative conscientiousness of the individual compared to others in our sample. For financial capital these components are: (1) am dummy which indicates if the household received regular income in 2012, (2) average monthly household income from 2012 in units of $1,000PHP$, (3) a dummy which indicates if the household possesses financial savings larger than $1,000PHP$, (4) a dummy which indicates if the household has debt larger than $5,000PHP$, and (5) a dummy which indicates if the household had to reduce food intake for some of its members due to a lack of money. The components of social capital are: (1) An index between zero and one which shows the relative trust towards governmental and non-governmental institutions compared to others in our sample, (2) an index between zero and one which shows the relative solidarity of an individual, (3) an index between zero and one which shows the relative trust towards bonding elements, such as friends, family and neighbors, (4) a dummy for generalized trust,

(5) the number of memberships in clubs and social organizations, (6) the number of days of voluntary work for the community in the last 90 days, (7) the absolute number of individuals living in a household, and (8) the number of close friends of the individual. Indicators for physical capital were retrospectively collected in 2016 and are consisting of a variable that (1) indicates if the household had implemented heavy materials, such as stone, bricks or iron sheeting in their house before Yolanda, and (2) the distance of the household to the nearest ocean waters.

To investigate the causal relation between typhoon exposure and the development of capital forms and risk and social preferences I exploit natural variation in the exposure to the typhoon measured by the minimum distance between the track of the typhoon[11] and village borders of the respective barangays[12] of this study. I then used the software QGis to calculate the shortest distance between village borders and the typhoon track. Although I received comments that usually one would use the distance between centroids of village borders and not the borders themselves, I kept on using the borderlines because some villages northern of the typhoon track in our sample have administrative borders which would reach far inland, although the village would actually be located on the shore, and hence distort the variation in distance. Hence measurement using borders produces less bias than measurement using centroids in my case. I then use this distance and correlate it with reported destruction in a village measured by households partly or totally destroyed relative to the absolute number of households. We have already seen the correlation between the destruction caused by the typhoon and the distance in Figure 3.1, where we see two clusters of highly affected villages (destruction $\geq 30\%$) and less affected villages (destruction $< 30\%$) with a clear cutoff at a relative distance[13] of about 0.4. For reasons of more straight forward graphical representation of the data and results, I will mostly be using a dummy which indicates if an individual was living in a "high intensity area", where the relative distance was below 0.4. I then use this dummy as my treatment variable to represent exogenous and random exposure to typhoon Yolanda. The dummy for living in high intensity areas is indicating if the village was hit seveerely by Yolanda in 2016, and therefore it is also specified as one in the year 2012 if the village belongs to high intensity areas and therefore the dummy is time invariant. I then use First difference estimation with clustered standard errors on the village

[11] GPS data for the track of Yolanda were taken from (Kitamoto, 2018).
[12] GPS data for village borders were taken from (PhilGIS, 2017).
[13] Relative distance is an index between zero and one where one means "furthest away from the typhoon track" and zero means "directly hit by typhoon track".

level using the balanced part of our panel data of the form:

$$\Delta Cap_i = \alpha + \beta_1 \Delta intens_j + \beta_2 Cap_{i2012} + \Delta u_{it} \tag{3.3}$$

Where ΔCap represents changes in capital indicators or their respective components (see above, dummies for educational attainment excluded). The variable $\Delta intens_j$ is an interaction between a dummy which is one if the year is 2016, and a time invariant dummy which indicates if the villages is situated in a high intensity area (as discussed above) and therefore the estimator β_1 represents the treatment effect of exposure to typhoon Yolanda. Cap_{2012} represents baseline values for capital endowment or endowment with the respective capital component to check whether or not regression to the mean is taking place in our sample (c.f. Barnett et al., 2004).

I then repeat the estimation using both the balanced and unbalanced panel with individual fixed effects panel regression with clustered standard errors on the village level to see whether we obtain similar results as from model 3.3 by using a different approach that looks at the within variation instead of cross sectional variation. The model using individual fixed effects takes the form:

$$Cap_{it} = \beta_1 year_t + \beta_2 \Delta intens_j + \alpha_i + u_{it} \tag{3.4}$$

Where α_i includes all time invariant individual characteristics, $year_t$ is a dummy that is one if the year was 2016, and $\Delta intens_j$ is again an interaction between the year dummy and the dummy for living in high intensity areas. Therefore the estimator β_1 should include developments over time, while β_2 captures the differences in development that arise due to disaster exposure.

4. Data

In this chapter I describe the data which we obtained in general and also am going to describe some key aspects of it, and will introduce the reader to some disaster related statistics in the context of disaster relief. I begin by giving a general overview in section 4.1 about socio-demographics and key characteristics of our experimental participants. This is followed by some data on how individuals reacted to the typhoon, how intensely they were affected, and also how help by other villagers and state officials was perceived (section 4.2). Additionally I will look a bit deeper into the types of copnflict that occurred due to the disaster relief process by looking at answers from surveys from experimental participants, and participants from the focus group discussions as well (subsection 4.2.2). After having read this chapter, the reader should have attained a general picture about the participants which we interviewed, and also have a sufficient idea about what followed the disaster in terms of exposure, affectedness and conflict.

4.1 Socio-demographics

In this section we will simply summarize descriptive statistics and give the reader a better feeling for our observed part of the Philippine population. As mentioned before, our sample consists of 27 villagers per barangay from 30 villages, leading to a total number of 810 observations per year. In 2012 we had 15 dropouts because sessions could not be filled with replacements for people who simply did not show up on time, whereas in 2016 we only had seven dropouts. We will give

Table 4.1: Socio demographics of both waves of observations (balanced & unbalanced panel)

	unbalanced			balanced		
	(I) 2012 mean (sd)	(II) 2016 mean (sd)	(II)-(I) (p-value)	(I) 2012 mean (sd)	(II) 2016 mean (sd)	(II)-(I) (p-value)
age	41.29 (10.58)	45.09 (11.91)	3.81*** (0.00)	41.94 (10.25)	45.99 (10.41)	4.06*** (0.00)
monthly income	4,039.87 (4,242.75)	5,774.53 (6,870.19)	1,734.66*** (0.00)	3,819.40 (3,605.84)	5,600.59 (5,360.82)	1,781.18*** (0.00)
years in village	31.77 (16.15)	34.78 (17.87)	3.01*** (0.00)	32.71 (15.92)	36.24 (16.14)	3.53*** (0.00)
household size	4.99 (1.84)	4.93 (2.68)	-0.06 (0.60)	5.08 (1.84)	5.16 (3.11)	0.08 (0.64)
sex (female=1)	0.54 (0.50)	0.67 (0.47)	0.13*** (0.00)	0.60 (0.49)	0.60 (0.49)	0.00 (1.00)
elementary school	0.24 (0.43)	0.29 (0.45)	0.05** (0.04)	0.27 (0.44)	0.31 (0.46)	0.04 (0.21)
high school	0.52 (0.50)	0.52 (0.50)	-0.01 (0.84)	0.53 (0.50)	0.52 (0.50)	-0.00 (1.00)
college	0.18 (0.38)	0.12 (0.33)	-0.06*** (0.00)	0.14 (0.35)	0.10 (0.29)	-0.05** (0.03)
vocational training	0.06 (0.23)	0.07 (0.26)	0.02 (0.19)	0.06 (0.24)	0.07 (0.26)	0.01 (0.59)
had to reduce meals	0.62 (0.49)	0.53 (0.50)	-0.09*** (0.00)	0.65 (0.48)	0.53 (0.50)	-0.12*** (0.00)
savings > 1000PHP	0.19 (0.39)	0.25 (0.44)	0.07*** (0.00)	0.17 (0.38)	0.27 (0.45)	0.10*** (0.00)
savings > 5000PHP	0.05 (0.22)	0.06 (0.23)	0.01 (0.66)	0.04 (0.20)	0.05 (0.23)	0.01 (0.53)
debt > 5000PHP	0.34 (0.48)	0.35 (0.48)	0.00 (0.92)	0.33 (0.47)	0.39 (0.49)	0.06* (0.08)
fisherman	0.30 (0.46)	0.20 (0.40)	-0.11*** (0.00)	0.27 (0.45)	0.27 (0.44)	-0.00 (0.88)
n	795	803		449	449	

more information about attrition, self selection and migration in section 6.0.1, whereas this section is simply providing a general overview about the data itself. The balanced part of the experimental panel contains 449 people from both waves and therefore contains 898 observations, whereas the unbalanced panel contains 1598 observations.

Table 4.1 summarizes key characteristics of our population from the experimental workshops and shows mean values, standard deviations, as well as significant differences between our sample from 2012 and 2016 for the balanced and unbalanced panel. Our average participant was between 18 and 75 years old with an average of about 41 in 2012 and 45 in 2016, whereas this increase in age makes perfect sense since we tried to obtain the same people from 2012 four years later. Of these roughly 40-45 years, an average person spends about 30-35 within the same village. Monthly household income increased in those four years by approximately 1,500PHP from an average of $\sim 4,000PHP$ to $\sim 5,500PHP$. These numbers differ substantially from official survey data from the Philippine government, stating average monthly income for region IV (Western Visayas) to be around 17,000PHP in 2012 (Philippine Statistics Authority, 2014) and 32,000PHP in 2015[1] (Philippine Statistics Authority, 2017). We cannot explain this substantial difference other than our sample coming from a pool of rural villages with restricted size and we cannot exclude selection of poorer people in those areas. Therefore our results should be seen as valid for this special part of the population, rather than the whole Philippine population. We also observe slight increases in savings, but also in debt over time. The share of people that had to reduce meals because of a lack of financial means to buy food decreased substantially over time from about 62% to 53% (p=0.00). Therefore we see a general improvement in the financial situation of the average person in our part of the population since income increased about 43% whereas absolute inflation between the years 2012 & 2016 was around 11% (The World Bank, 2018). The female part of our population was about 54% in 2012 and rose to 67% in 2016. We can only speculate about the reasons for women to be more likely to appear in 2016. We believe that the opportunity costs for women are generally lower since they mostly do not have an occupation or are housewives (as is the case for 40% of our female sample). Typical jobs in our region are farming, fishing (also occupations related to fishing like fish vendors), working as some sort of barangay official, and manual labor. Educational proxies like the highest degree in education show that we have some sort of measurement error, because the percentage of people that mention college as their highest educational

[1] at the time of writing, official data for 2016 was not available.

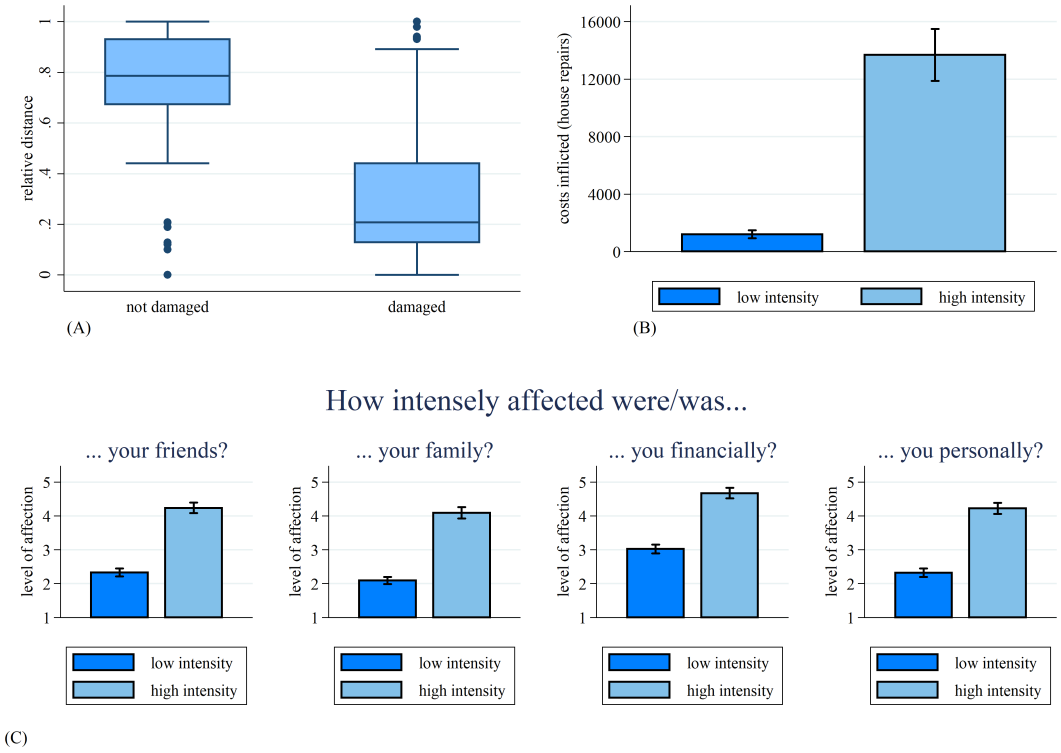


Figure 4.1: Self perception of affection across high intensity and low intensity villages. Part (A): Distribution of damaged households across different relative distances from the storm; Part (B): Inflicted cost of repairs due to Yolanda across high intensity and low intensity villages; Part (C): Subjective affection across low intensity and high intensity villages

degree has dropped over time in the balanced part of the panel. This is a reminder that survey data is not always 100% reliable and that results should be generally interpreted with care (c.f. Deaton, 1997; Laajaj and Macours, 2017).

Household size was around 5 people in both years in the balanced and in the unbalanced panel and corresponds roughly to the official number of 4.4 in official survey data (Philippine Statistics Authority, 2016). Since fishermen are one especially vulnerable group towards extreme changes in the environment and destruction of the coastal marine life that follows an extreme natural disaster, we decided to highlight their presence in the data a little bit. In 2012, roughly one third of our sample consisted of fishermen, whereas this portion drops to one fifth in 2016. Again, we speculate that there are higher opportunity costs for fishermen to re-appear in our workshops and we attribute this drop mainly through this channel.

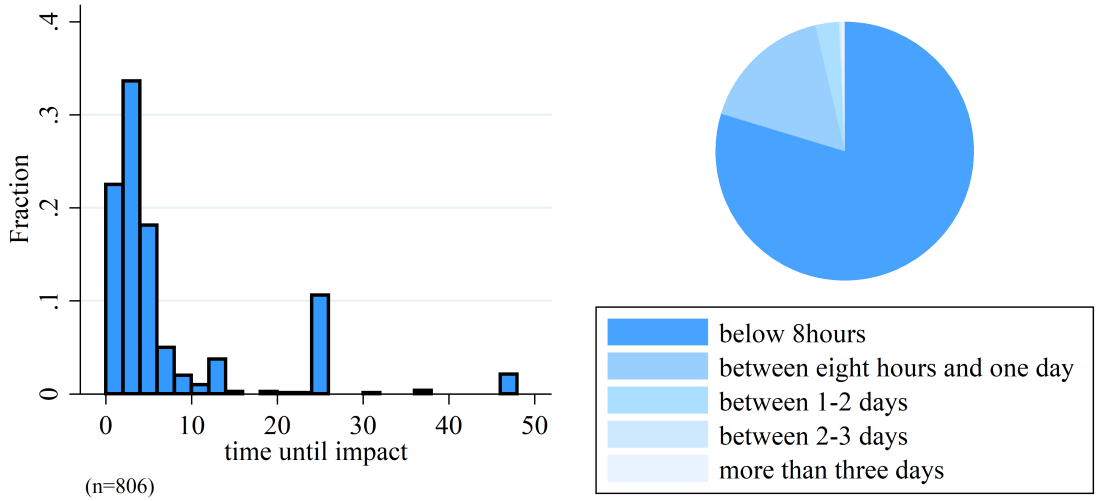


Figure 4.2: Distribution of time until impact of Yolanda (in hours)

4.2 Reaction, exposure, affectedness & help

In this section I want to describe what happened to the individuals during the "shock phase". We will take a look at how individuals reacted when they realized that a disaster was incoming, how intensely they were exposed, and how heavily they were affected as a consequence. The average time between the realization of Yolanda making landfall and the landfall actually happening was on average 7.3 hours according to our participants, whereas roughly 80% of our participants stated that they had about eight hours or less (see Figure 4.2). We also asked where our participants were at the time of impact. Roughly 81.5% of all interviewed individuals from 2016 stated that they were at their own house. The remaining 18% were either in other houses within the same village (3.7%), in another village nearby (1.5%), in an official evacuation center (7.9%), or somewhere else[2] (5.3%). We also asked them on a five point Likert scale how many people have left the village because they knew that a storm was coming[3]. Although many people from our sample stayed at home, a substantial proportion of individuals reported that they remember many people leaving their village because of an incoming catastrophe. Especially participants from high intensity villages said that almost all people left the village (32.63%), whereas the proportion of people stating the same is much smaller in low intensity villages (6.53%). This example shows how different people perceived the reaction of others, since there is also quite a number of people stating the opposite. Additionally, we asked village officials

[2]Other locations were either larger cities in the Philippines or rather vaguely specified areas (for example:"At the mountain tops", "On a boat", or "Behind the mountain")

[3]1:"Almost none"; 2:"few"; 3:"some"; 4:"many"; 5:"Almost all"

specifically for records that show how many people left the village temporarily or permanently because of Yolanda. The numbers which government officials gave us are in no way as dramatic as the perception of our surveyed participants, since the proportion of temporal or permanent out-migrants to corresponding village inhabitants was relatively small (see Table A2.2). Therefore either official documents and/or statements from government officials were not complete, or the perception of individuals was somehow biased.

Did our participants prepare for the disaster in any way? We asked in our survey what kind of preparatory measures they took, if any. Almost all of our participants stated that they prepared for the disaster in some way (93.8%). Although some had more time to react than others, there was no clear correlation between the time individuals had until time of impact and some specific kind of preparatory measure (see Table A2.3. While there were no differences between the relative share of individuals that reinforced their house in high intensity villages (60.7%) and low intensity villages (58.7%), we clearly observe that individuals from villages that became closer to the eye of the storm were more likely to suffer damages (see Figure 4.1). From part (A) of the figure we can see that the likelihood of a house to become damaged is much higher for households that were closer to the eye of the storm during the course of Yolanda. Costs for repairs were rough estimations from our participants and we see that costs were on average substantially higher in high intensity villages ($\sim 13,700PHP$) than in low intensity villages ($\sim 1,220PHP$). Furthermore, the individual perception of being affected is significantly higher in high intensity villages. This is what anyone would suspect. However, this shows that the categorization into "low intensity" and "high intensity" on the village level correlates well with individual affection.

For purposes of data reduction I am using an index for individual perceived affectedness, which includes a battery of questions concerning the individual financial and personal pressure, as well as the individual financial and personal pressure relative to other villagers. The results of a corresponding factor analysis can be found in Table A2.5. We can observe that the questions from this battery in the survey correlate very well with each other and can easily be integrated into one common indicator for individual perceived affectedness. Figure 4.3 shows the distribution of the resulting index for all observations made in 2016 and how the distribution differs across low intensity and high intensity villages. We can observe that, although the categorization into low intensity and high intensity villages seems to hold, there is still considerable variation of perceived affectedness on the individual level. While in low intensity villages the index takes a value

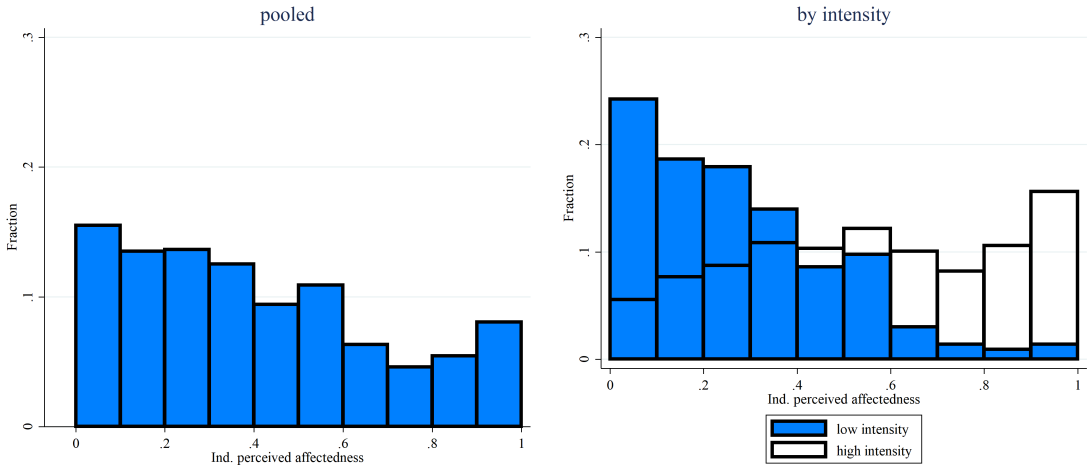


Figure 4.3: Distribution of self perception of affectedness index pooled, and across high intensity and low intensity villages.

of 0.27 on average, the average in high intensity villages is considerably higher (0.55, p=0.000). A Kolmogorov-Smirnov equality of distributions test also rejects the hypothesis that the two distributions are equal for both types of intensity (p=0.000). Therefore we see that, although there is still variation on the individual level within both types of villages, on average individuals seem to be aware that villages in the south were hit harder by the storm than villages in the north of the Island.

Now I will take a look at the amount of internal and external help from others that arose as a reaction to the destruction caused by Yolanda. However, we never gathered hard data on actual amounts of relief goods or manual labor that was provided by other stakeholders, such as external agents like governmental or non governmental organizations, friends and neighbors. Therefore we tried to be as careful and sensitive as possible, while attaining the maximum amount of information possible. To elicit how much help arrived to a household we asked our participants a battery of questions where they had to state on a scale of one to seven what stakeholders provided what amount of aid, where one would mean "no help at all" and seven means "most proficient help". The stakeholders that were included in the battery of questions were governmental institutions[4], non governmental institutions, and the church. Additionally we asked how much help they were receiving from friends and neighbors. I use the individual perception of internal (friends and neighbors) and external (governmental and non governmental institutions) help as a proxy to determine how much help came

[4]National government, local government and barangay council;

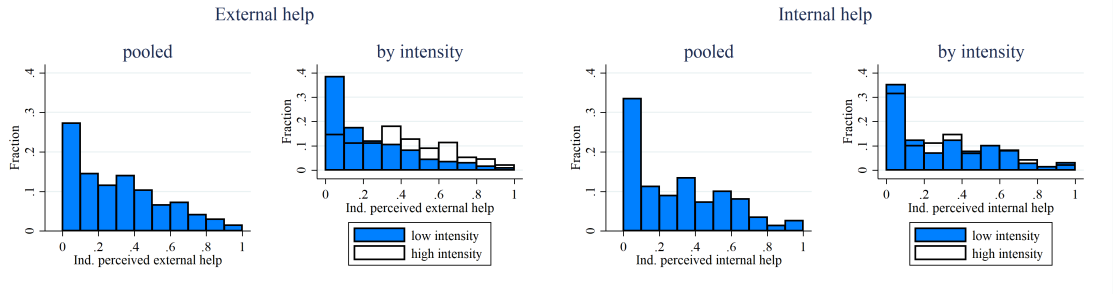


Figure 4.4: Distribution of self perception of internal and external help index pooled, and across high intensity and low intensity villages.

from these different stakeholders. For purposes of data reduction I summarize the variables of each category into one common index using factor analysis[5]. Figure 4.4 shows the distribution of internal and external help indices in the pooled data set and across high intensity and low intensity villages. We can observe that while there seems to be a different distribution in external help, namely a tendency towards high intensity villages, the perception of internal help does not vary across high intensity and low intensity villages. A Kolmogorov-Smirnov test for equal distributions rejects the hypothesis that the distribution of external help was similarly distributed across high intensity and low intensity villages (p=0.000), but does not reject the null in the case of internal help (p=0.485). This shows that the government and non governmental organizations were more active in the northern regions of Panay which were hit harder by the storm than other regions. Mean index values between high and low intensity villages are also significantly different from each other (0.23 vs. 0.39, p=0.000). This relation however is not true regarding the help of friends and neighbors (0.29 vs. 0.30, p=0.516). This shows that the perception of help from friends and neighbors did probably not depend on the level of affectedness.

Additionally we asked our participants a bit more in detail about their perception of the fairness of external aid provision and how they felt about the relief process. All questions could be answered on a scale between one and seven, where seven meant “I completely disagree” and seven meant “I completely agree”. We also asked whether or not conflicts arose because of external aid provision. To attain some information about the quality of aid provision we asked participants if they thought that aid provision was fair, if the amount provided was sufficient, and if the process of aid provision was well organized. We also wanted to know if some received more aid than they needed, if people tended to act selfish with

[5]The results of a factor analysis on external help variables can be found in Table A2.7 and the results for internal help variables in Table A2.6 in section A2 the Appendix

regard to relief goods, if conflicts arose due to a lack of aid, and if individuals felt left alone with their problems. Lastly we also attained information about if the participants themselves helped wherever they could and also if they feel closer to other villagers now than before the storm. Let us have a look at how individuals perceived the quality of aid provision between high intensity and low intensity areas. Using two sample T-tests we can observe that the perception of quality of aid provision is not significantly different between high and low intensity villages. The fairness of aid distribution (4.54 vs. 4.41, p=0.353), as well as the amount of relief goods (3.82 vs. 3.65, p=0.217) and the organization of the relief process by external agents (4.26 vs. 4.09, p=0.207) was not perceived substantially different between high and low intensity villages. However, what is striking is that more emotional aspects of aid provision differed significantly between both types of villages. In high intensity villages, people seem to have rather received more than they needed (3.39 vs. 3.86, p=0.000), people were rather acting selfish (3.42 vs. 3.80, p=0.007), individuals rather felt left alone with their problems (3.32 vs. 3.59, p=0.046), and the perception of conflict due to a lack of aid was significantly higher (3.43 vs. 3.93, p=0.000). This could mean that external aid providers also bring the potential for conflicts to a community since activity by external actors was higher in high intensity villages and we observe higher indicators for conflict or disappointment about the actions of other villagers. Lastly we can look at if people themselves think that they feel closer to the people in their village than before, which on average they seem to do, but not significantly varying between the two intensity levels (4.95 vs. 4.85, p=0.451).

4.2.1 Perception of beneficiary selection

At one point in the experimental survey we asked individuals how disaster relief aid was targeted, and how such efforts should be targeted according to their own opinion. We let participants rank certain targeting criteria which represented classic strategies how disaster relief could be targeted. First we asked to whom disaster relief should be targeted to first according to their opinion, and then we asked them afterwards how it was actually done by disaster aid providers. Participants could choose among the following selection criteria:

- *According to peoples exposure*: The higher the suffering or damage, the higher the amount of relief goods someone should receive.
- *Egalitarian*: All people should get the same amount of aid, regardless of their respective damages they suffered.

Table 4.2: Mean perception of fairness, quality and conflict potential of aid provision

Variable	low intensity	high intensity	p-value
Distribution of aid was fair	4.54	4.41	0.353
	(1.95)	(2.08)	
Amount of aid was sufficient	3.82	3.65	0.217
	(1.91)	(2.01)	
Aid was well organized	4.26	4.08	0.207
	(1.95)	(2.00)	
Some received more than needed	3.39	3.86	0.000***
	(1.85)	(1.96)	
People were acting selfish	3.42	3.80	0.007***
	(1.95)	(1.93)	
I felt left alone	3.32	3.59	0.046**
	(1.92)	(1.97)	
Received unexpected help from others	4.30	4.55	0.091*
	(2.08)	(2.08)	
I tried to help wherever possible	5.70	5.68	0.836
	(1.35)	(1.33)	
I feel closer to others now	4.95	4.85	0.451
	(1.74)	(1.81)	
Conflicts because of lack of aid	3.43	3.93	0.000***
	(1.98)	(1.91)	

Standard deviations in brackets.
All answers were given on a scale between one and seven.
One means “I completely disagree” and seven means “I completely agree”

- *Egalitarian towards exposed*: Only people who were affected receive aid, but everyone gets the same amount regardless of the damages they suffered.
- *Priority on vulnerable victims*: These are disabled persons, female headed households and/or with majority elderly and children or households with single source of income which is based on a vulnerable industry, whose property was at least partly destroyed by typhoon Haiyan/Yolanda.
- *Priority on victims that prepared more for the typhoon than others*: (i.e. particularly, only those victims who conducted all preparatory measures and who have not (re-)built their homes in high-risk areas and in less resilient kind or only victims with disaster insurance for their uninsured losses and whose property was at least partly destroyed by typhoon Haiyan/Yolanda.)
- People who suffered damages, but *do not receive remittances.*
- *First come, first serve*: i.e. people, whose property was at least partly destroyed by typhoon Haiyan/Yolanda should receive aid in the order of their claims.
- *Nobody should receive aid*

From Table 4.3 we can see that the actual and desired practices on average did not differ much from each other with regard to their respective average rank. In general, individuals wish for a targeting towards vulnerable victims, such as single mothers, poor or elderly people that need help the most. the second priority goes to targeting practices which give individuals the more disaster relief goods the more they are affected by the destructive forces of natural disasters. On rank three is egalitarian targeting which is followed by egalitarian targeting towards exposed. This means that in general, individuals prefer that everyone gets disaster relief, even if some unaffected individuals attain relief goods as a consequence, over egalitarian aid distribution towards the exposed, which would leave out the rest of the villagers. The fifth place is on average held by the criteria to distribute relief goods towards victims who prepared themselves for the disaster. Interestingly, individuals from the experiments preferred that no one would get disaster relief goods over either people that receive no remittances get some, or a first come-first serve approach. The actual practices that took place in each village basically overlap with what individuals previously stated to be the desired approach. Mean differences between actual and desired targeting practices were rather low and between -0.16 and +0.24. Therefore we see that disaster relief aid was perceived to be targeted to the more vulnerable in general, followed by

Table 4.3: Mean desired and actual rank of targeting practices according to experimental participants

	Desired	Desired mean rank	Actual	Actual mean rank	mean difference between actual and desired	ranked 1st	ranked 2nd	ranked 3rd	ranked 4th	ranked 5th	ranked 6th	ranked 7th	ranked 8th
According to exposure	3.78	2	3.73	2	0.05	123	140	110	126	153	72	42	38
Egalitarian	4.11	3	4.23	3	-0.12	95	100	128	143	133	92	72	42
Egalitarian towards exposed	4.12	4	4.24	4	-0.13	79	115	149	129	121	100	68	40
Vulnerable victims	3.28	1	3.39	1	-0.12	214	150	118	113	71	51	55	32
Victims who prepared	4.57	5	4.72	5	-0.16	60	112	108	119	127	92	97	88
No remittances	5.34	7	5.40	8	-0.06	30	75	81	71	87	175	180	107
First come first serve	5.58	8	5.34	7	0.24	121	36	41	36	58	120	133	253
Nobody should receive aid	5.33	6	5.24	6	0.09	80	76	69	67	58	99	156	196

targeting according to household exposure and egalitarian approaches. Overall expectations by participants seem to have been met regarding the targeting of disaster relief efforts. In the next subsection I will look at the question, if disaster relief efforts may have led to some conflict.

4.2.2 Conflict because of disaster relief

In a time when resources are scarce and demand for basic goods for daily consumption is high, the potential for conflict is inevitable. In this subsection I explore the kinds of conflict that arose due to disaster relief efforts and provide an overall picture of the situation with regard to conflicts by looking at data which was provided by experimental participants and participants from focus group discussions. We have seen above that the level of conflict was perceived higher in high intensity villages compared to low intensity villages according to experimental participants. We basically asked focus group discussion participants the same question on a scale of zero to seven where one meant "no conflict in village at all" and seven "severe amount of conflict in village"[6]. The mean answers vary significantly between high and low intensity villages, whereas high intensity levels almost experienced one standard deviation more conflict than low intensity villages (2.12 vs. 3.62, p=0.000). This coincides with the average statements that experimental participants made and hence we believe that especially more exposed areas were prone to conflict. We tried to quantify the amount of conflict that arose by offering the participants of the focus group discussions a conflict matrix, where participants would allocate beans on a raster of different types of conflict to indicate what type of conflict occurred and how intense it was compared to other types of conflict (the more beans on one rater, the more intense

[6] Although we actually offered only a scale from 1-7, in some villages participants stated that there were no conflicts at all and therefore we entered a zero when this was the case.

the conflict), as I already described in subsection 3.3.3. The results of the conflict matrix are visualized in Table 4.4. As we can see, conflicts tended to be perceived more in high intensity villages than in low intensity villages, whereas in both types of villages conflicts mainly arose from disagreements with other villagers or village/state officials such as kagawats (councilors) or punongs (mayors). Conflict is always substantially higher in high intensity villages, with the exception of conflict regarding a lack of cooperation of other villagers, where the mean value is higher in low intensity villages. The main sources of conflict seem to be financial aid, which seemed to have caused disagreements between villagers in general and disagreements between villagers and state officials. Also the general supply with relief goods seems to have caused conflict, and also exclusion from aid was apparently a topic in both high and low intensity villages. Conflicts with other villages were rather minor compared to conflicts with other villagers from the same village or village officials. When we asked them directly about the most intense conflict that arose in their respective village we more or less uniformly got the answer in both high and low intensity villages that "Financial aid and relief goods were unevenly distributed[7]". We basically observe the same pattern if we look at the responses of participants from the experimental games. At one point we asked participants a bit more in detail about different kinds of power abuse that may have arose due to disaster relief efforts. They had to answer a battery of questions on a scale of one to seven, where one meant "this never occurred" and seven meant "this occurred all the time". According to the answers from our participants it sometimes happened that people with better relations to aid providers received more than others, while the perception of this happening is significantly higher on average in high intensity villages (3.26 vs. 3.61, p=0.005). We can observe the same difference when we look at if it sometimes happened that people with good relations received aid sooner than others (3.37 vs. 3.73, p=0.003). It also happened, although rarely, that individuals claimed false affectedness to receive aid (2.48 vs. 2.67, p=0.094) and that some individuals had to provide goods and services to receive aid by providers (2.63 vs. 2.66, p=0.765). It also happened more often in high intensity villages that people took at the expense of others (2.35 vs. 2.61, p=0.019) and that individuals who were not eligible to receive disaster aid received it nevertheless although it was needed by others (2.61 vs. 3.03, p=0.000). We also see significantly more complaints about relief goods being of bad quality in high intensity villages (2.82 vs. 3.05, p=0.049) and that providers kept goods for themselves instead of distributing it to the needy (2.45

[7] Broad summary of verbal statements from participants by the author

vs. 2.90, p=0.000). Additionally, people felt that they had nowhere to go to if they wanted to complain about the situation both in high and in low intensity villages, as the share of individuals that stated that they theoretically were able to make complaints to officials about the situation is rather small (0.17 vs. 0.18, p=0.993). Therefore we can see mainly two things: Firstly, the disaster relief process was most likely accompanied by negative consequences such as power abuse and corruption and generally the perception of our participants was that many acts of power abuse took place (although rather rarely). Secondly, we see systematic differences between high and low intensity villages regarding the perception of conflict and corruption and therefore I see it as additional justification to categorize villages binary into high and low intensity villages. It seems plausible that exposure to such experiences changes not only the perception of other stakeholders in the long term, but also that individuals adapt their behavior according to their new experiences and changes in values and social norms which they observe due to this process.

4.3 Outcomes in experimental games

The outcomes of the main experimental games which are used to investigate the research questions at hand are descriptively presented in this section. We begin by looking at the outcomes of the solidarity games and compare them to outcomes from studies which also implemented them. The same procedure is applied for outcomes of the risk task which we applied in the field.

4.3.1 Solidarity games

On average, individuals contributed 30.41PHP to the anonymous losing player in the first solidarity game, while transfers to known players were significantly higher and amounted to about 32.95PHP on average in 2012 (p=0.000). In the second solidarity game in 2012, individuals transferred 32.27PHP to the losing anonymous player on average, while the transfer to the known player was also significantly higher and about 35.40PHP (p=0.000). Therefore we see clear signs of discrimination against unknown players in this experimental setting, which is not uncommon to observe in experimental studies which investigate in-group and out-group behavior (c.f. Bohnet, 1999; Fershtman et al., 2005; Dufwenberg and Muren, 2006). The same observation holds if we look at outcomes from the second year of observations. Transfers to anonymous players were on average 25.98PHP in the first solidarity game from 2016, while transfers to non-anonymous players were 33.84PHP on average (p=0.000). Transfers in the second solidarity game

Table 4.4: Mean conflict in villages according to focus group discussion participants, high and low intensity villages

Low intensity villages						High intensity villages					
General intensity of conflict: 2.11	Within household	Within barangay members	With villagers from neighboring villages	With strangers	With state officials	General intensity of conflict: 3.62	Within household	Within barangay members	With villagers from neighboring villages	With strangers	With state officials
Relief goods (water, food,... etc.)	0.00	3.47	0.00	0.00	1.06	Relief goods (water, food,... etc.)	0.92	4.23	0.76	0.08	3.84
Financial aid	0.00	1.35	0.00	0.00	0.88	Financial aid	0.31	5.46	0.85	0.00	7.00
Reconstruc-tion assistance and shelter	0.00	0.24	0.00	0.00	0.00	Reconstruc-tion assistance and shelter	0.00	0.62	0.31	0.00	0.23
Exclusion from aid	0.00	2.82	0.00	0.00	3.17	Exclusion from aid	0.00	2.84	0.00	0.00	2.53
Lack of cooperation	0.12	2.35	0.00	0.00	2.71	Lack of cooperation	0.54	0.46	0.00	0.00	2.23

legend: 0 | 0 – 1 | 1 – 2 | 2 – 3 | 3 – 4 | 4 – 5 | 5 – 6 | 6 – 7 | 7 – 8

no conflicts — very high amount of conflict

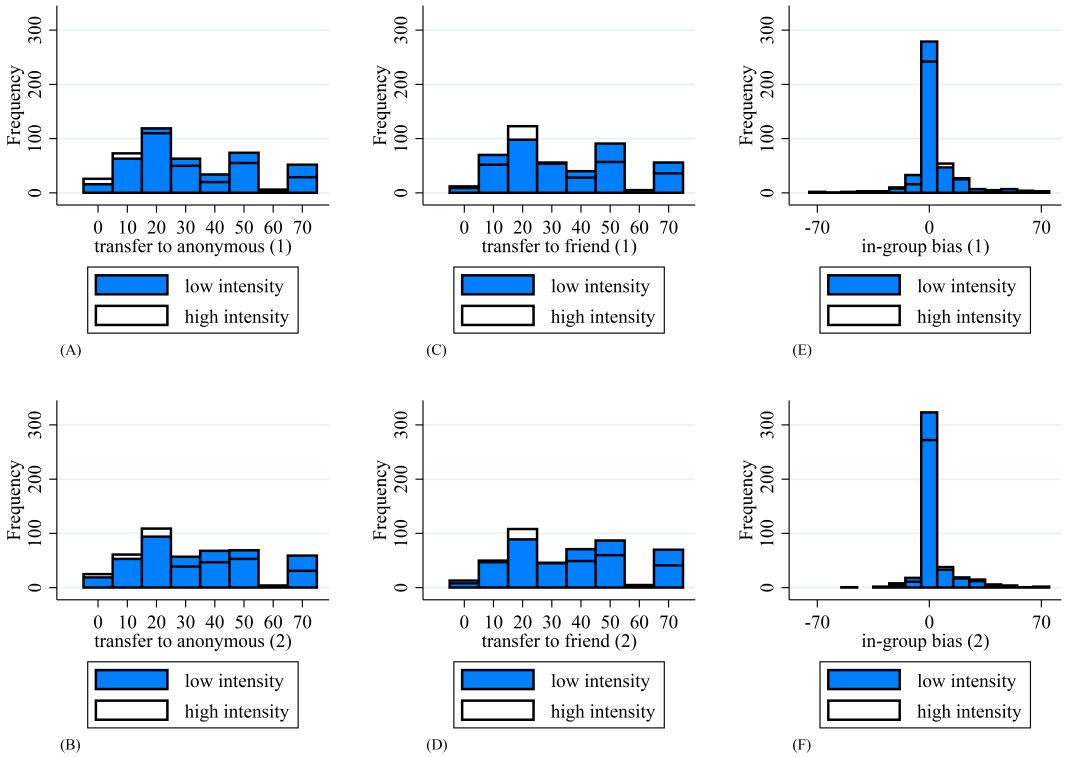


Figure 4.5: Distribution of decisions in the solidarity game 2012: part (A): transfer to anonymous players in the first game; part (B): transfer to known group members in the first game; part (C): difference between transfers to anonymous and non-anonymous players in the first game; part (D): transfer to anonymous players in the second game; part (E): transfer to known group members in the second game; part (F): difference between transfers to anonymous and non-anonymous players in the second game

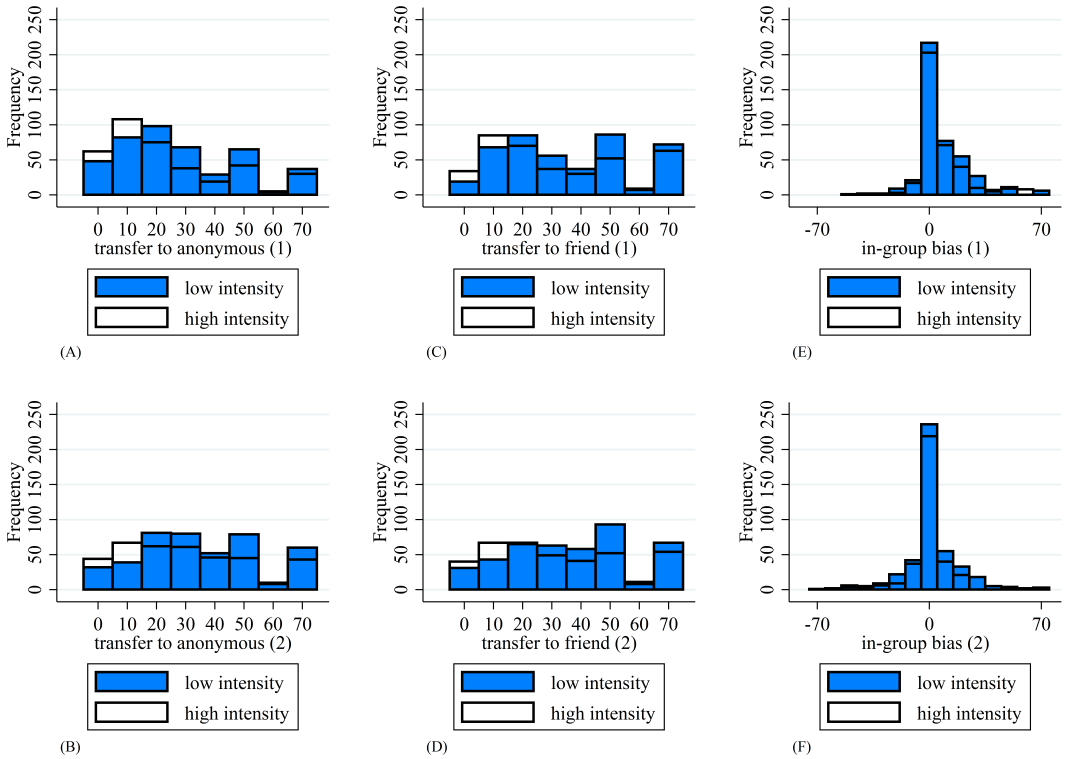


Figure 4.6: Distribution of decisions in the solidarity game 2016; part (A): transfer to anonymous players in the first game; part (B): transfer to known group members in the first game; part (C): difference between transfers to anonymous and non-anonymous players in the first game; part (D): transfer to anonymous players in the second game; part (E): transfer to known group members in the second game; part (F): difference between transfers to anonymous and non-anonymous players in the second game

which was played in 2016 show the same pattern. While transfers were lower to anonymous players (32.83PHP), transfers to non-anonymous players were significantly higher (34.51PHP) and hence we keep finding discrepancies between transfers to known and unknown players (p=0.003). The respective distribution of transfers in both solidarity games from 2012 can be seen in Figure 4.5 and the distribution of transfers in 2016 in Figure 4.6 respectively. Additionally we observe a round effect in both years, since transfers seem to increase in the second solidarity game in general. While transfers to anonymous players in the first game were 30.41 on average in 2012, transfers increased to 32.27PHP on average in the second round (p=0.007). The same relation can be seen when we look at transfers to friends and relatives in 2012 (32.95PHP vs. 35.40PHP, p=0.001). If we look at the experimental outcomes from 2016 however, we see this round effect only for transfers to anonymous players (26.00PHP vs. 32.83PHP, p=0.000), while transfers to non-anonymous players did not differ significantly between rounds (33.88PHP vs. 34.51PHP, p=0.391). If we look closer at figures 4.5 and 4.6, we can also observe that the share of individuals who give nothing at all in both solidarity games has increased substantially. The number of individuals who give nothing at all to anonymous players in the first game has increased from 44 to 110, while in the second game the number of individuals who give nothing at all to losing anonymous players increased from 44 to 76. The same development can be found in transfers to non-anonymous players. While the share of individuals who gave nothing to known players increased from 21 to 53 in the first game, the number of individuals increased from 21 to 71 in the second game. Hence we can see that overall individuals are less willing to share their endowment with a losing player in the follow up experiments, than they initially were in the first wave of observations. If we compare the distribution of transfers to the initial solidarity game by Selten and Ockenfels (1998) we can see that the share of individuals who give the maximum amount possible is substantially higher in our sample than in a sample of German students and as a consequence the share of individuals which give nothing in the solidarity game substantially smaller (c.f. Selten and Ockenfels, 1998, p. 519)[8].

4.3.2 Risk games

In section 3.3.2 I described the risk elicitation tasks which we applied in the field. The outcome for the binary choice between two lotteries was that a share of 440 individuals chose option A, which was indicating a preference for the riskier

[8] See also Ockenfels and Weimann (1999).

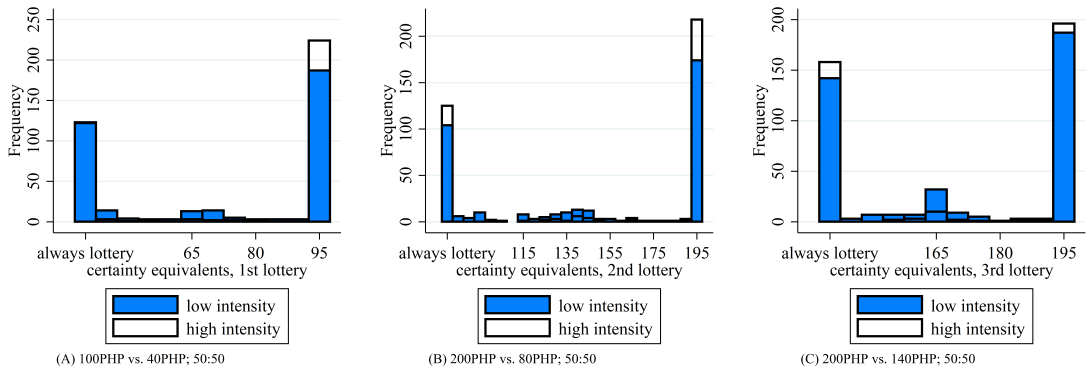


Figure 4.7: Distribution of certainty equivalents in all three lotteries; part (A): distribution of certainty equivalents for the first lottery; part (B): distribution of certainty equivalents for the second lottery; part (C): distribution of certainty equivalents for the third lottery;

option with a lower expected value. The remaining 355 individuals "insured" themselves against total losses by forgoing $40PHP$ to increase the minimum earning in the game by $60PHP$. Compared to Eckel and Grossman (2002) and Eckel and Grossman (2008), we observe a different pattern since their samples of American students on average prefer more risky options over similar options with reduced losses for the costs of smaller gains[9].

In 2016, we used a procedure which elicited certainty equivalents for three lotteries. The resulting distributions of respective certainty equivalents can be found in Figure 4.7. As we can see, most of our participants chose to either always play the lottery or never. Out of 810 individuals, only relatively few participants switched to a certain amount of money before they decided to play a lottery (84 individuals in the first lottery, 126 in the second, and 98 in the third lottery). Although we carefully explained the game to the participants and asked control questions in the end to make sure they understood the consequences of their choices, we did not reduce the choice set of individuals to consistent choices and as a consequence we observe some individuals with multiple switching. Those individuals were excluded from the analysis since there is no way known to me to quantify their choices in a meaningful way. 70 individuals made inconsistent choices in the first lottery , while 63 participants engaged in multiple switching in the second, and 29 in the third lottery respectively. I will only consider individuals which made consistent choices in all three lotteries (N=693). Hence about 15% of individuals show inconsistent behavior in a risk elicitation task which uses certainty equivalents in our sample. This share is substantially higher than found in similar

[9]Compare for example outcomes in choices 4 and 5 in Eckel and Grossman (2002) on page 287 and Eckel and Grossman (2008) on page 3.

studies which use very similar approaches in developing countries. For example, Vieider et al. (2016) only observe that 0.6% of a sample of Ethiopians is switching multiple times in their choice lists, and Vieider et al. (2019) find no multiple switching at all in a Vietnamese sample. I administer the substantially higher share of inconsistent individuals to the fact that we never explicitly mentioned multiple switching while we were explaining the game, making sure that we did not subconsciously direct decisions of our participants towards single switching and hence guaranteeing free choices in the game. The remaining individuals which only switched once at most seem to show quite consistent behavior across lotteries in general as well, since correlation coefficients between certainty equivalents of all lotteries are between 0.49 and 0.62 with respective p-values below the one percent level.

4.4 Proxies & indices for capital forms

This sections describes what proxies and indices for the different forms of capital are used in this study. Measuring capital forms in general is a challenging task and scholars in economics currently struggle to construct well applicable measures for each underlying concept. Therefore I elaborate a bit more on the variables which are relevant in this thesis and give reasons for their application in this thesis.
Similar to Laroche et al. (1999), I define human capital as accumulated knowledge and skills which an individual obtained throughout his/her lifetime. Although health and personality traits (such as diligence and perseverance) are acknowledged parts of human capital (c.f. Luthans et al., 2007), the most commonly used proxies for human capital in economic literature are educational variables, such as years of formal education or highest educational degree (cf. Castelló and Doménech, 2002; Gennaioli et al., 2012; Jones, 2014; Goldin, 2016). Although the focus lies clearly on educational variables in economics, psychologists may argue that there exist fundamental personality traits which define how well an individual can function in a work-environment, thus extending the definition of human capital by (arguably stable[10]) personality traits (cf. Seibert et al., 1999; Luthans et al., 2007; Borghans et al., 2008). Therefore we also collected information about the "Big Five" aspects of personality, which are commonly used measures in psychology for assessing elements of an individuals' personality (Digman, 1990; McCrae and Costa Jr, 1999). The "Big Five" model, also referred to as the OCEAN model[11], has found its place in personality measurement among psychologists and

[10] (cf. McCrae and Costa Jr, 1994; Hampson and Goldberg, 2006; Debast et al., 2014)
[11] OCEAN stands for "openness, conscientiousness, extroversion, agreeableness and neuroti-

is more and more used by economists as well to account for aspects of personality. However, if I apply the concept to our sample in the Philippines, we can see from Table 4.5 that a factor analysis does not come to the conclusion that variables which are attributable to the OCEAN model do fulfill minimum criteria to construct indices for an underlying factor, with the exception of conscientiousness. In a discussion about the external validity of the OCEAN model, Gurven et al. (2013) find that the conceptualization of the "Big Five" does not generally apply in every context. They apply the OCEAN model in a rural context with a Tsimane population in Bolivia and failed to find robust support for the five factor model. Their study showed that usually the five-factor model works quite well with an educated sample in a laboratory setting, but fails to deliver conclusive measures for the components of the OCEAN model when applied in a rural, less educated population. Comparably, the five factor model for some reason was not entirely applicable in our sample with the one exception of conscientiousness. This finding may have some additional implications about the applicability of the five factor model in a sample of rural villagers from the Philippines, although there were probably and admittedly too few variables collected for each dimension of personality and critique on the five factor model would be too premature. Nevertheless we can see that variables that relate to the underlying concept of conscientiousness correlate reasonably well with each other such that I am to a satisfactory degree confident that I can use it as an indicator for one aspect of human capital (see Table 4.5). Additionally, principal component analysis shows that the components which I was suspecting to compose human capital do just sufficiently meet criteria for index construction. However, as we can see from Table 4.5, education is only to a minor part embedded in the index for human capital, which is why I am going for a strategy using two approaches: see how results and respective interpretations change if I use the index for human capital solely, or alternatively its components. Therefore I will stick to the usual strategy of economists to measure human capital also by simply using the highest educational degree as an indicator for individual accumulated knowledge. Additionally I want to keep in mind that personality as well might be an important aspect of human capital and therefore I will pay attention to not neglect the measures for personality completely, although the concept partly failed to be applicable in the context of this study. Unfortunately one aspect of human capital, namely general health, was not measured by us in the first wave of observations and therefore this study lacks data in that dimension. Hence highest educational degree and conscientiousness seem to be the most reli-

cism".

able indicators for human capital which I have access to. This should be kept in mind when interpreting results later, especially when I am also using an indicator for overall human capital later on.

Since the first wave of observation was heavily focused on pro-social behavior and attitudes, we collected a substantial number on social capital indicators in 2012. I use exploratory factor analysis to derive underlying factors of different social capital candidate variables. Table 4.6 shows the variables I use for both years to extrapolate social capital indicators and respective factor loadings on underlying concepts. The variables used to be candidates as social capital proxies were decided by using a framework by Krishna and Shrader (1999) which visualizes the different aspects of social capital on the micro and macro level. Additionally, I use indicators for networking and community engagement which are also commonly accepted parts of social capital (cf. Lillbacka, 2006; Chiesi, 2007; Hikichi et al., 2017). The set of variables used in this study embeds concepts of institutional trust, solidarity, trust in bonding elements such as family, friends or neighbors, trust in general and additional indicators for community engagement such as voluntary work or enrollment in clubs and associations. Each underlying concept meets commonly used criteria to be used in a composite index according to cronbach's alpha (cf. Cortina, 1993). As I do not expect that social capital is a concept which causally influences outcomes in each type of social capital indicator, but rather is a collective composite of each underlying factor, I use principal component analysis to derive a principal which i call "social capital". As we can see from Table 4.6, the loadings of each variable on the principal social capital are unevenly distributed in favor of variables measuring elements of trust. Additionally, principal loadings are rather small. Therefore, I suspect that the common index derived from principal component analysis for social capital is not sufficiently constructed to measure social capital in general and weights trust elements too heavily, although the index itself would meet minimum criteria to be accepted as an underlying measure. Hence for the remainder of the thesis I am going to continue by looking at the overall index for social capital with special attention to its single components, namely institutional trust, solidarity, trust in bonding ties, trust in general, number of club memberships and times of voluntary community work. Unfortunately, our measure for network size, the number of close friends, was measured differently in 2012 and 2016[12], which is why I will not try to embed it in a common index

[12] In 2012 we asked directly: "How many close friends do you have?", whereas in 2016 we asked to mark persons on a list as a close friend, friends of which they expect help in times of need, friends who helped them in times of need and friends which they helped in times of need (see Surveys from 2016 in section A10.

Table 4.5: Factor loadings of aspects of big five personality traits and human capital

Variable	Big Five					All candidates	Human capital
	Extraversion	Agreeable-ness	Conscien-tiousness	Neuroticism	Openness		
Highest educational degree						0.02	0.02
Considers herself sociable	0.28					0.22	0.36
Considers herself reserved	0.28					0.35	
Likes to cooperate with others		0.43				0.08	0.57
Finds fault at others		-0.14				0.58	
Relies on own abilities		0.51				-0.16	
Solves problems on her own		0.48				0.44	
Thinks competition is good for a society		0.23				0.40	
Plans her schedule			0.70			0.20	0.70
Brings things to an end			0.70			0.67	0.67
Sees herself as lazy			-0.13			0.64	
Does a thorough job			0.23			-0.12	
Carefully plans actions			0.67			0.33	0.67
Gets nervous easily				0.27		0.03	
Considers herself relaxed				0.08		0.47	0.46
Thinks fate often gets in the way				0.26		0.10	
Has an active imagination					0.09	0.42	0.38
Regrets being impulsive sometimes					0.44	-0.00	-0.04
Sometimes does things to cheer herself up					0.44	-0.02	-0.06
Alpha	0.25	0.40	0.55	0.15	0.33	0.58	0.59
Eigenvalue	0.16	0.75	1.50	0.15	0.40	2.75	2.21

for both years, but instead look at it separately and keep the different types of measurement in both years in mind.

Indicators for financial capital used in this study are indicators which show if an individual receives regular income on a monthly basis, the average monthly household income, the presence of savings larger than $1.000PHP$, the presence of debts larger than $5.000PHP$, and a dummy which shows if someone in a household had to make cuts in food intake due to a lack of money. An exploratory principal component analysis shows a positive loading of being indebted if I use all compnents in one common index. This may very well make sense if we consider the possibility that only better endowed individuals may afford to engage in indebtedness. However, since the relation between being in debt and financial capital is not entirely clear to me, I refrain from using the variable we have for indebtedness in an index for financial capital, and hence exclude it (see Table 4.7).

Measures for physical and natural capital on the household or individual level were not collected in the baseline study in 2012 and therefore I cannot explore into the relation between physical or natural capital and disaster resilience in detail. However, we asked participants what materials they imbedded in their housing and therefore got a vague picture of the stability of their respective house. We openly asked participants if they would list completely what kind of materials were used for constructing their houses. From their answers, we could identify six kinds of materials which they used: thatch (Nipa leaves), bamboo, wooden planks, cement, iron sheets, and stones/bricks. Figure 4.8 shows the percentage of individuals across low intensity and high intensity villages which use a certain type of material in their housing. I checked whether individual households were different with regard to the material structure of their houses. From our observations in the field we could not find substantial differences in the structure of houses or other forms of long term adaption to cyclones. We still asked our participants what kind of materials were implemented in their housing before Yolanda. The results from this part of the survey can be seen in Figure 4.8. We can see that the main materials that are used for housing are bamboo, thatch (from the Nipa palm), wooden planks, iron sheets, cement, and sometimes bricks and stones. There were no other materials used for the main structure of the houses of our participants. We observe that households from high intensity villages rather had thatch (31.7% vs. 45.6%, p=0.000) and wooden planks (40.6% vs. 56.0%, p=0.000) implemented in their housing than households from low intensity villages, whereas low intensity households rather implemented iron sheeting (58.0% vs. 51.5%, p=0.065).

Table 4.6: Factor loadings of aspects of social capital

Variable	Institutional trust	Solidarity	Trust in bonding ties	All candidates	Social capital
Trust in national government	0.59			0.21	0.21
Trust in provincial government	0.63			0.22	0.22
Trust in municipal government	0.64			0.25	0.25
Trust in barangay captain	0.65			0.27	0.27
Trust in barangay kagawat	0.65			0.28	0.28
Trust in NGO's	0.40			0.16	0.16
Trust captain in emergency	0.58			0.37	0.37
Trust kagawat in emergency	0.57			0.37	0.37
Trust bank in emergency	0.15			0.08	0.08
Trust insurance provider in emergency	0.21			0.14	0.14
Trust FARMC in emergency	0.30			0.20	0.21
Transfer in 1st solidarity game to anonymous		0.74		0.02	0.02
Transfer in 2nd solidarity game to anonymous		0.80		0.04	0.04
Transfer in 1st solidarity game to friend		0.76		0.04	0.04
Transfer in 2nd solidarity game to friend		0.79		0.05	0.05
Trust in relatives			0.77	0.31	0.31
Trust in friends			0.80	0.32	0.32
Trust in neighbors			0.70	0.33	0.33
General trust				0.08	0.08
Number of club-memberships				0.03	0.03
Times of voluntary work for community in last 90 days				0.02	0.02
Household size				0.04	0.04
Barangay kagawat				0.03	0.03
Number of close friends				-0.00	
Alpha	0.74	0.85	0.83	0.67	0.68
Eigenvalue	2.97	2.38	1.72	4.25	4.27

Table 4.7: Principal components of financial capital indicators

Variable	All candidates	Financial Capital
receives regular income	0.41	0.40
relative monthly household income	0.56	0.57
savings $\geq 1.000PHP$	0.54	0.55
reduced meals last month	-0.43	-0.47
debt $\geq 5.000PHP$	0.22	
Alpha	0.32	0.35
Eigenvalue	1.60	1.57

If we check how the usage of materials correlate, we can see that light materials, such as thatch, bamboo and wooden planks correlate well with each other, while they correlate negatively with heavy materials such as iron sheets and cement and vice versa. Therefore it should be safe to say that there exist two types of housing: the first type rather consists of light materials and the other type of rather heavy materials (see Table A2.8). Hence we can categorize households into using rather light materials for housing and rather heavy materials (where the criterion for falling into using heavy materials is that a household at least used cement and iron sheeting in their structure before Yolanda). As a result, I identify 243 households out of 810 which engaged in using rather heavy materials for building their house and therefore we should be able to check whether the engagement into using rather heavy materials mattered for disaster resilience. There are no significant differences between low intensity and high intensity villages regarding the mean engagement in using heavier materials (31.70% vs. 28.38%, p=0.318). Unfortunately, we did not collect indicators for natural capital on the household or individual level and therefore this study is not able to derive the importance of natural capital on disaster resilience, or changes in natural capital due to disaster exposure.

To get an overview of the development of the five forms of capital over time, Table 4.8 summarizes the relevant variables and indices which I use for the different forms of capital and also shows mean values across both waves of observation for the unbalanced panel, such that we get a picture of how the different variables developed over time in high and low intensity areas. A corresponding table for the balanced part of the panel can be found in the Appendix (Table A2.9). The development of the human capital indicator was positive over time in low intensity villages (increase from 0.68 to 0.77, p=0.000), whereas there seems to be no significant difference over time in high intensity villages. We can observe that the share of individuals whose highest educational attainment is elementary schooling

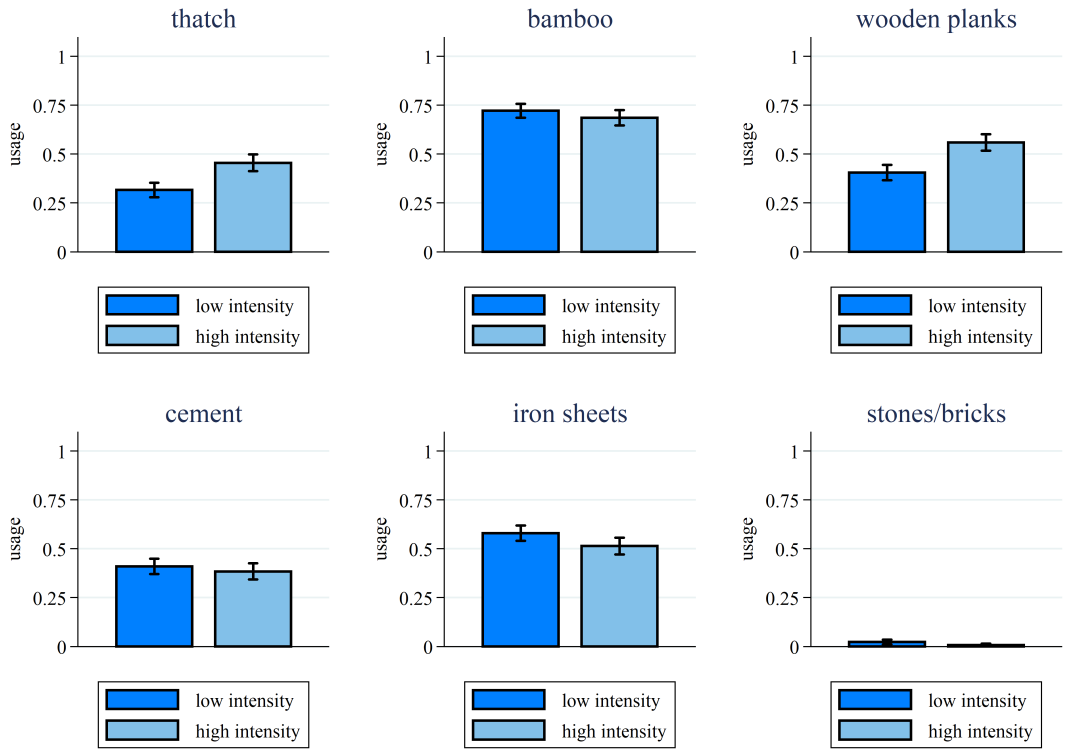


Figure 4.8: Materials that were used for housing before Yolanda

has increased by eight percentage points over time in high intensity villages (from 27% to 35%), whereas the share stayed almost the same in low intensity villages (22% vs. 23%). At this point I have to mention that our measure for education seems fuzzy over time, since we also observe that the share of individuals that report to have at least one college degree has shrunk more than half in high intensity villages. Unfortunately this is also true for the balanced part of the panel. Therefore it seems like our measure for having a college degree is somewhat faulted, since it makes no sense that the share of individuals which attained the highest attainable degree changes negatively within this set of individuals. If we look at the index for conscientiousness, we see that individuals from low intensity villages scored higher on average in the index in 2016 than in 2012 (0.80 vs. 0.74, p=0.000). This increase corresponds roughly to a third of a standard deviation in low intensity villages in 2012, whereas the index significantly decreased on average by 0.02 points in high intensity villages (p=0.038). We also see substantial changes in the endowment of financial capital on average in our sample. The index overall developed positively both in high (0.11 vs. 0.16, p=0.000) and low intensity areas (0.10 vs. 0.14, p=0.000) by about 4-5 index points. This development can be mostly explained by the general improvement of index components. For

example, the share of individuals reporting to receive regular monthly income has increased between three fifth in low intensity villages, and three fourth in high intensity villages, which indicates that income flows have become more stable and predictable for individuals over time. We also observe substantial and significant increases in self-reported monthly household income between almost 20% in low intensity areas, and roughly 37% in high intensity villages. This shows a general increase in the financial wealth of households, since prices in the Philippines have increased only by roughly 11% between 2012 and 2016 (The World Bank, 2018). We also observe significant increases in the share of individuals which report to have savings above or equal $1.000PHP$ in low intensity villages (17% in 2012, 25% in 2016), whereas the 5% increase in high intensity villages is only statistically significant in the balanced part of the panel. Additionally we can observe that the share of individuals which claim to have debt above $5.000PHP$ has significantly increased in low intensity villages, whereas this share seems to have declined on average in high intensity villages, although not significantly. An indicator for poverty, namely the share of individuals which claim to have had days in the last month where they had to cut meals because of a lack of money, has roughly stayed constant over time in low intensity villages (55% vs. 50%), whereas we observe substantial declines in high intensity villages. While the share of individuals which claimed to have had cuts in meals in high intensity villages was around 70% in 2012, this number declined significantly by 14% (20% in the balanced part of the panel). When we look at social capital, we see that in general the index declined over time both in low intensity (0.58 vs. 0.54, p=0.001) and high intensity villages (0.57 vs. 0.54, p=0.031) by between 3-4 index points. For the single components of social capital we can observe that trust in institutions has generally declined over time, both in low intensity villages (by roughly 0.04 points) and high intensity villages (0.03 points). The index for solidarity has stayed almost constant over time (around roughly 0.61 points, both in low and high intensity villages), whereas we see some degree of heterogeneity between the components of the solidarity index[13]. Additionally we see that trust in bonding ties was rather robust over time and around 0.61 index points on average in both years for both types of villages. The most striking changes over time in our sample regarding social capital indicators are changes in the share of individuals which say that people in general can or cannot be trusted. In our data we see that whereas

[13]We observe that there are significant changes in transfers to anonymous players in the first solidarity game over time, whereas there seem to be no significant changes over time of transfers to anonymous players in the second solidarity game, and also no changes of transfers to friends or relatives in both games over time.

the share of individuals who said that people can be trusted in general was around 25%-30% in 2012, this share declined substantially both in high and low intensity villages over time, namely to 7% in low intensity, and to 16% in high intensity villages on average. The number of club memberships declined significantly in high intensity villages by 0.15 on average, whereas the times of voluntary work in the last 90 days stayed rather robust across time and around two days on average both in high and in low intensity areas. Also the size of households was rather robust across time and stayed around five persons on average in both types of villages. Since we lack baseline data in physical capital, we can only look at the types of materials households used for constructing their house according to their statements in 2016. We also look at the self stated distance of households to the sea, assuming that individuals did not change their location of residence between the waves of observation. We see that 32% of households embedded heavy materials in their housing in low intensity areas, and around 28% in high intensity villages. We also observe substantial differences in both types of villages regarding their self reported distance to the sea, indicating that randomization did not work out as well with regard to the average perceived distance to the ocean. However, we know for a fact that all of our villages were located directly at the sea with regard to their village borders and almost all of them had households residing directly at the sea (with the exception of barangay Nanding Lopez, which was situated a bit further inland). Summarizing Table 4.8, we observe changes in capital forms over time, whereas for human capital, individuals perceive themselves as more conscientious on average in low intensity villages and less conscientious in high intensity villages. The data show substantial changes in financial capital, namely mainly increases in financial endowment and possibly more access to lending. Indicators for social capital have shown rather negative changes over time with some robust facets, such as household size and voluntary community engagement. At this point I also want to remind the reader that the number of close friends was elicited differently in both years, and therefore changes in their mean values could be explained by the difference in elicitation. This could also be the cause why the standard deviations for network sizes are declining substantially over time.

4.5 Clusters of capital endowment

In this section I want to check whether or not there are certain clusters of individuals which have characteristic capital endowment to be later able to check if certain clusters have performed better in terms of disaster recovery than other

Table 4.8: Main indicators for the five forms of capital used in this study

	low intensity villages			high intensity villages		
Variables	2012	2016	p-value	2012	2016	p-value
Human capital	0.68	0.77	0.000***	0.76	0.76	0.797
	(0.17)	(0.14)		(0.13)	(0.14)	
Highest degree: elementary school	0.22	0.23	0.684	0.27	0.35	0.017**
	(0.42)	(0.42)		(0.44)	(0.48)	
Highest degree: high school	0.50	0.51	0.891	0.55	0.53	0.659
	(0.50)	(0.50)		(0.50)	(0.50)	
Highest degree: college	0.20	0.16	0.213	0.15	0.07	0.001***
	(0.40)	(0.37)		(0.36)	(0.26)	
Highest degree: vocational training	0.08	0.09	0.395	0.03	0.05	0.352
	(0.27)	(0.29)		(0.18)	(0.21)	
Conscientiousness (index from 0-1)	0.74	0.80	0.000***	0.82	0.80	0.038**
	(0.19)	(0.15)		(0.14)	(0.14)	
Financial capital	0.11	0.16	0.000***	0.10	0.14	0.000***
	(0.11)	(0.13)		(0.10)	(0.11)	
Receives regular income	0.25	0.41	0.000***	0.20	0.35	0.000***
	(0.44)	(0.49)		(0.40)	(0.48)	
Monthly household income	5288.47	6324.38	0.000***	3753.53	5147.16	0.000***
	(3761.30)	(5237.63)		(4610.29)	(7998.74)	
Savings $\geq 1.000PHP$	0.17	0.25	0.002***	0.21	0.26	0.121
	(0.37)	(0.44)		(0.41)	(0.44)	
Dept $\geq 5.000PHP$	0.32	0.38	0.099*	0.37	0.31	0.105
	(0.47)	(0.49)		(0.48)	(0.46)	
Reduction of food intake	0.55	0.50	0.151	0.70	0.56	0.000***
	(0.50)	(0.50)		(0.46)	(0.50)	
Social capital	0.58	0.54	0.001***	0.57	0.54	0.031**
	(0.16)	(0.17		(0.15)	(0.17)	
Institutional trust (index from 0-1)	0.64	0.60	0.000***	0.63	0.60	0.000***
	(0.15)	(0.16)		(0.14)	(0.15)	
Solidarity (index from 0-1)	0.50	0.49	0.499	0.43	0.42	0.489
	(0.24)	(0.25)		(0.23)	(0.26)	
Trust in bonding ties (index from 0-1)	0.62	0.61	0.440	0.60	0.61	0.607
	(0.22)	(0.25)		(0.21)	(0.25)	
Generalized trust	0.29	0.07	0.000***	0.27	0.16	0.000***
	(0.45)	(0.25)		(0.44)	(0.37)	
Number of club-memberships	0.47	0.51	0.376	0.58	0.43	0.001***
	(0.68)	(0.78)		(0.66)	(0.62)	
Times of voluntary work for community in last 90 days	2.54	2.72	0.701	1.87	1.87	0.980
	(4.68)	(8.49)		(3.17)	(2.97)	
Household size	5.06	4.98	0.635	4.91	4.87	0.810
	(1.87)	(3.03)		(1.80)	(2.20)	
Number of close friends	2.83	2.53	0.013**	2.76	2.58	0.360
	(2.00)	(1.40)		(3.83)	(1.14)	
Barangay kagawat	0.15	0.12	0.237	0.15	0.12	0.189
	(0.02)	(0.02)		(0.02)	(0.02)	
Physical capital						
Used heavy materials in housing before Yolanda		0.32			0.28	
		(0.47)			(0.45)	
Distance of house to the ocean		1264.80			138.80	
		(9809.56)			(391.36)	
N	426	432		369	378	

clusters. The idea behind this kind of analysis is that it maybe the case that one single type of capital may be important for building disaster resilience, but what if an individual is completely lacking in the rest of them? Say for example an individual has a huge amount of financial assets, but is no longer able to use them in a meaningful manner since systems around him broke down which enabled him to make use of those assets. Then the functioning of financial capital as a channel to alleviate the consequences of a disaster became meaningless since it alone is not able to function in that manner without certain structures, channels or systems that synergize with its functionality. Hence we check whether there are certain clusters that were especially effective in using their different endowments of capital and see, which combination of capital forms could potentially be most relevant. Hence we conduct a cluster analysis using the previously constructed indices for human capital, social capital and financial capital and check if there are some meaningful clusters of capital endowment. For easier cluster interpretation we standardize variables for the respective indices to means of zero with a standard deviation of one. Since we are interested in the effects of being in one cluster on resilience indicators in 2016, we only conduct this type of analysis for the balanced part of the panel and only cluster individuals capital endowment from 2012. We use single linkage clustering for outlier detection and follow up by using Wards linkage to decide on the number of clusters which we use in the end. The resulting dendograms can be seen in Figure 4.9. From part (A) of Figure 4.9 we can observe that there are about 10 observations in our balanced data set which are quite unique in their type of capital endowment and hence continue to cluster individuals without taking those observations into account. A Wards linkage cluster analysis then suggests that a solution with about three clusters would probably be most efficient in our case (part (B)). Therefore we continue by using a k-means algorithm[14] to assign individuals into three clusters and check whether we can interpret those clusters in a meaningful way, such that it could make sense to use them later on for analysis. The final result of this analysis can be found in Figure 4.10. The first cluster we obtain in the end contains 179 observations and consists on average of individuals who are endowed with very little human capital and are also quite below average in social capital and financial capital. The second cluster which consists of 169 individuals is on average endowed quite well with human and social capital, but lacks a bit financial capital on average. The third cluster, consisting of 81 individuals, is endowed with a little above average human capital and substantially above average with financial capital, but lacks a bit social

[14]To obtain replicable results, we used a seed for random procedures of 11032013.

capital compared to the rest of our participants. Table 4.9 shows mean values of standardized capital indicators and shows the results of tests for equality of mean values using a two sided t-test. As we can see, cluster one, two, and three all differ significantly from each other with regard to average social capital endowment. The only differences that are not significantly different from zero are differences in financial capital between clusters one and two and differences in human capital between clusters two and three. We use these clusters later on when we discuss a possible relation between different forms of capital endowment and performance in disaster resilience indicators. Now the question remains if there are certain demographic groups allocated within those clusters we just defined. We look at this question by regressing certain characteristics of individuals on cluster allocation. The results of this regression are shown in Table 4.10, which shows that there essentially no explanatory power for individual characteristics such as age, gender, relationship status or the duration an individual lives in a village on cluster allocation, with the exception of years living in a barangay significantly explaining allocation in cluster number two, although with quite low effect size. An increase in living in the barangay by one standard deviation is associated with an increase in the probability to be allocated in cluster two by about 0.06 standard deviation, which indicates that people living longer in a barangay have a small but significant tendency to have more social capital, since cluster two has especially much social capital on average. The same can be said about household sizes, which have a similar effect on the probability of being allocated in cluster two.

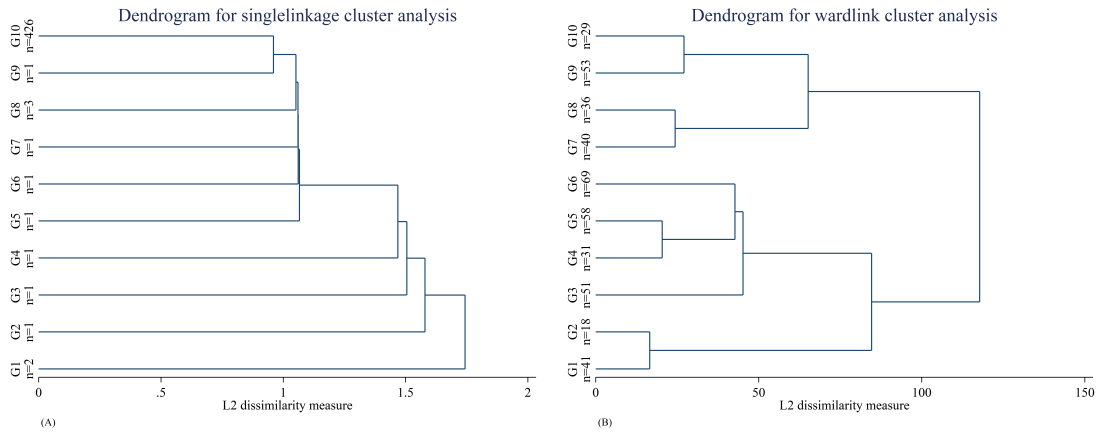


Figure 4.9: Dendograms after cluster analysis; part (A): dendogram after single linkage cluster analysis for outlier detection; part (B): dendogram after Wards Linkage cluster analysis to decide on number of clusters

Table 4.9: Mean endowment with capital forms of clusters

	clusters			mean comparison tests p-values		
	1	2	3	1 vs. 2	2 vs. 3	1 vs. 3
Human capital (2012)	-0.73	0.59	0.45	0.000	0.141	0.000
	(0.87)	(0.69)	(0.75)			
Financial capital (2012)	-0.37	-0.45	1.33	0.156	0.000	0.000
	(0.63)	(0.54)	(0.67)			
Social capital (2012)	-0.55	0.66	-0.14	0.000	0.000	0.000
	(0.82)	(0.76)	(0.85)			
n	179	169	81			

Table 4.10: Effect of certain demographic characteristics on cluster allocation

	(1) Cluster 1	(2) Cluster 2	(3) Cluster 3
Age	-0.00	-0.04	0.04
	(0.02)	(0.03)	(0.03)
Female	-0.02	0.00	0.02
	(0.03)	(0.03)	(0.04)
Status: single	-0.00	0.03	-0.03
	(0.02)	(0.03)	(0.04)
Years living in village	-0.02	0.06**	-0.04
	(0.03)	(0.03)	(0.03)
Household size	-0.04	0.06**	-0.01
	(0.03)	(0.03)	(0.02)
Fisher	-0.06	0.04	0.01
	(0.07)	(0.08)	(0.08)
Constant	0.22***	0.37***	0.41***
	(0.03)	(0.04)	(0.04)
Observations	421	421	421
F	0.68	1.82	0.49
R^2	0.02	0.01	0.01
Adjusted R^2	-0.00	0.00	-0.01

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

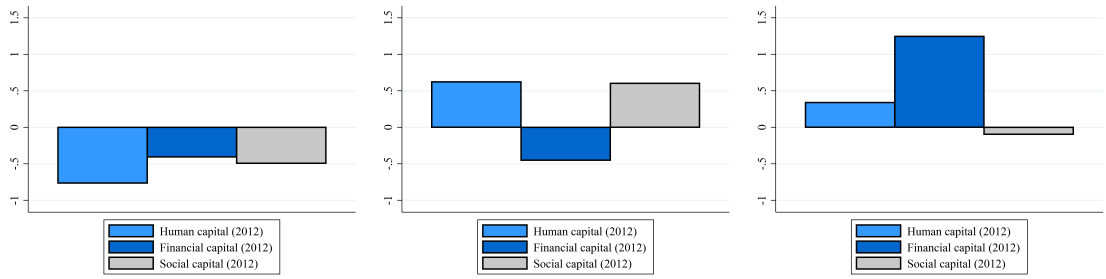


Figure 4.10: Clusters after k-means clustering and corresponding mean capital endowments

5. Results

This chapter is dedicated to exploring the research questions and hypotheses at hand by reporting the output of multivariate regression models and graphical representations of relations between variables. The first section explores what drivers of resilience are by testing the framework developed in section 2.2, and give an interpretation of the results. the second part of this chapter elaborates more on the causal relation between disaster exposure and changes in capital forms, pro-social behavior and risk behavior due to typhoon exposure.

5.1 Influence of capital on aspects of resilience

This section looks deeper into the relation between the five forms of capital and aspects of disaster resilience. I use simple OLS estimations of different aspects of resilience (recovery time, recovery costs, individual perceived affectedness, the time between people realizing that they would be hit by a storm and actual impact, the perceived level of external help, and the perceived level of internal help from friends and neighbors) using variables which I defined in section 4.4 that indicate the individual or household endowment with different forms of capital before the exposure to Yolanda (in the year 2012). I am also using village fixed effects to control for the exposure to typhoon Yolanda on the village level and other unobserved co-variates which might play a role in disaster recovery on the village level (for example external disaster relieve aid). For all dependent variables which represent parts of resilience we look at five model specifications. The first four

are merely tests for the explanatory power of each category of capital on the dependent variable, whereas model specification five represents a complete model which includes all facets of capital measured. This section begins by looking at the effect of broader measures for the forms of capital which were constructed in section 4.4 and concludes by looking at the components of each index in more detail. This approach allows us to find broad effects of the forms of capital on aspects of disaster resilience and to look at the sources and the heterogeneous impacts of index components in more detail later on.

Table 5.1: Effect of five capital forms indices on recovery time

	(1)	(2)	(3)	(4)	(5)
Human capital	0.03				0.04
	(0.04)				(0.05)
Financial capital		-0.09**			-0.10**
		(0.04)			(0.04)
Social capital			0.04		0.04
			(0.06)		(0.06)
HH used heavy materials				-0.05	-0.03
				(0.04)	(0.04)
Distance to ocean				0.04	0.04
				(0.03)	(0.04)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.23***	-0.23***	-0.22***	-0.20***	-0.25***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)
Observations	433	433	433	430	430
F	2.62	2.28	2.61	2.37	1.91
R^2	0.15	0.16	0.15	0.15	0.17
Adjusted R^2	0.09	0.10	0.09	0.09	0.09

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We begin by looking at Table 5.1, which shows the results of a simple OLS regression of the broader measures for the capital forms on recovery time. For easier interpretation of effect sizes, I standardized variables to have a mean of zero and a standard deviation of one. Models (1)-(4) show the results by testing the impact of each form of capital on the outcome variable singularly, while model (5) shows a combined model to test whether or not any significant results we find stay robust across a different model specification, where we include all broader measures for the single capital forms. We can observe that most indicators for the capital forms do not show a significant relation between recovery time (a.k.a. the number of days households needed to repair their houses), with the exception of the indicator for financial capital, which is inline with our expectations regarding its singular effect, but not inline with our expectations regarding the effects of social capital and human capital, which we also hypothesized to be prevalent

when tested. From models (2) and (5) we can see that an increase of financial capital by one standard deviation is correlated to a decrease in recovery time by about 0.09 standard deviations. This effect stays robust if we also include standard control variables into the models such as age, gender and family status (see table A2.15 in the Appendix). This result suggests that the relative importance of the forms of capital which we measured is not as weighted as we expected, since there are quite strong arguments for social capital and human capital to be important as well for a quicker disaster recovery (see section 2.2). However, at this point we observe that rather financial capital seems to drive the recovery time of households the most in our sample, whereas other indicators were not able to explain recovery time significantly in a regression.

Table 5.2: Effect of five capital forms indices on recovery costs

	(1)	(2)	(3)	(4)	(5)
Human capital	0.04				0.03
	(0.05)				(0.04)
Financial capital		0.05			0.04
		(0.07)			(0.07)
Social capital			0.04		0.03
			(0.05)		(0.05)
HH used heavy materials				0.04	0.04
				(0.05)	(0.05)
Distance to ocean				0.01	0.01
				(0.01)	(0.01)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.42	0.45	0.43	0.44	0.42
	(0.34)	(0.34)	(0.35)	(0.35)	(0.35)
Observations	445	445	445	445	445
F	6.16	6.26	6.35	5.90	5.27
R^2	0.25	0.25	0.25	0.25	0.26
Adjusted R^2	0.20	0.20	0.20	0.20	0.20

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Next we look at Table 5.2 which shows the results of a regression of the broader capital indicators on recovery costs. We can see that none of the indicators are able to explain recovery costs in any of the model specifications. Combining this finding with the results from Table 5.1, we can not reject the null of H1a and H2a, since none of the broader indicators for social capital and human capital were able to explain outcomes in neither recovery time nor recovery costs. However, we can not completely reject the null of H3a, since we see a negative and significant relation between financial capital and recovery time.

Next we look at Table 5.3 to investigate the relation between broader measures

Table 5.3: Effect of five capital forms indices on time until impact

	(1)	(2)	(3)	(4)	(5)
Human capital	0.02				0.01
	(0.05)				(0.05)
Financial capital		0.07			0.06
		(0.05)			(0.05)
Social capital			0.04		0.04
			(0.04)		(0.04)
HH used heavy materials				0.08	0.08
				(0.06)	(0.06)
Distance to ocean				-0.00	0.00
				(0.03)	(0.03)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.32***	-0.30***	-0.32***	-0.32***	-0.32***
	(0.10)	(0.10)	(0.10)	(0.09)	(0.10)
Observations	446	446	446	446	446
F	1.99	1.96	1.98	1.66	1.51
R^2	0.05	0.05	0.05	0.05	0.06
Adjusted R^2	-0.02	-0.02	-0.02	-0.02	-0.02

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

for the forms of capital and the time individuals had between they realized a strong disaster was incoming, and actual landfall of typhoon Yolanda. All model specifications in this table show that there is no significant relation between our broader measures for capital forms and the time which individuals had to react to the storm. Hence it seems like for now we can reject hypotheses H1b, H2b, and H3b. Therefore our results at this point suggest that none of the capital forms were helpful in deciding the reaction time of individuals to the disaster, which indicates that other factors may help better to shorten reaction times. However, since we do not have a measure for functioning warning systems, we cannot say much about this type of relation. About the relation between financial assets and social capital however, we observe that none of which were relevant in that regard, which means that in our sample investments in these types of capital would probably not be very fruitful to decrease reaction times. By including standard control variables we obtain the same results, however one probably interesting side finding is an effect of being single on the reaction time. Singles tended to have less time to react than non-singles by between one fourth and one fifth of a standard deviation in reaction time (see Table A2.17 in the Appendix). This finding suggests that married couples or individuals that live with their partner without being married find it easier to react to a disaster and need less time to realize that something devastating is incoming.

Table 5.4 shows how different endowments of capital in 2012 explain the indi-

Table 5.4: Effect of five capital forms indices on individual perceived affectedness

	(1)	(2)	(3)	(4)	(5)
Human capital	0.01				-0.00
	(0.01)				(0.01)
Financial capital		0.01			0.01
		(0.01)			(0.01)
Social capital			0.03***		0.03***
			(0.01)		(0.01)
HH used heavy materials				-0.00	-0.01
				(0.01)	(0.01)
Distance to ocean				0.00	0.01
				(0.01)	(0.01)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.42***	0.43***	0.42***	0.43***	0.42***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Observations	446	446	446	446	446
F	12.51	12.60	13.16	12.06	12.23
R^2	0.43	0.43	0.44	0.43	0.44
Adjusted R^2	0.39	0.39	0.40	0.38	0.39

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

vidual perceived affectedness in 2012. It shows that there is is a possible relation between endowment with social capital and the individual perceived affectedness. I have shown before that the individual perceived affectedness is very well correlated to the actual strength of destruction within a village, and therefore this relation seems odd, since we clearly expected a negative and significant relation between endowment with social capital and being affected in general. However, we observe quite the opposite: individuals with a one standard deviation higher endowment in social capital have a 0.03 standard deviation higher perceived affectedness on average. This result may suggest that there are channels at work which make individuals with higher social capital more sensitive towards the perception of being affected.

Now we look at Tables 5.5 and 5.6 which show the results of a OLS regression of the forms of capital on the perceived external (by governmental and non-governmental institutions) and internal help (by friends and neighbors). We see from models (1), (2), and (3) in Table 5.5 that the broader measures for human capital and financial capital are not able to significantly explain perceived external help. However, we can observe that social capital might play an important role in explaining the perception of help from governmental and non-governmental institutions, since the coefficient for social capital shows a positive and significant relation, where an increase in social capital by one standard deviation corresponds

Table 5.5: Effect of five capital forms indexes on perceived external help

	(1)	(2)	(3)	(4)	(5)
Human capital	-0.00				-0.03
	(0.05)				(0.05)
Financial capital		0.04			0.05
		(0.04)			(0.04)
Social capital			0.11**		0.11**
			(0.05)		(0.05)
HH used heavy materials				-0.10**	-0.10**
				(0.04)	(0.04)
Distance to ocean				-0.06	-0.06
				(0.05)	(0.06)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.33	0.33	0.30	0.31	0.32
	(0.21)	(0.21)	(0.21)	(0.21)	(0.22)
Observations	446	446	446	446	446
F	6.05	6.17	6.54	6.44	6.19
R^2	0.25	0.25	0.26	0.26	0.28
Adjusted R^2	0.20	0.20	0.21	0.21	0.22

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.6: Effect of five capital forms indices on perceived help by friends and neighbors

	(1)	(2)	(3)	(4)	(5)
Human capital	-0.03				-0.06
	(0.05)				(0.05)
Financial capital		0.10*			0.11**
		(0.05)			(0.05)
Social capital			0.10*		0.10**
			(0.05)		(0.05)
HH used heavy materials				-0.03	-0.04
				(0.05)	(0.05)
Distance to ocean				-0.05	-0.04
				(0.06)	(0.06)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.34	0.34	0.30	0.31	0.35
	(0.22)	(0.22)	(0.22)	(0.21)	(0.21)
Observations	446	446	446	446	446
F	1.22	1.40	1.35	1.16	1.47
R^2	0.07	0.07	0.07	0.07	0.09
Adjusted R^2	-0.00	0.01	0.01	-0.00	0.01

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

to an increase of perceived external help by about one tenth of a standard deviation. This provides additional evidence for the assumption that social capital increases the probability of interaction with external stakeholders which provide help after a crisis. Additionally we observe that households that used heavy materials perceived that they received less external help than households which only used light materials. This might indicate that there was some sort of targeting external help towards households with less structural integrity, which is inline with the assumption that households that were heavier affected (in terms of destruction of their household) received more aid by external actors. This is also indicated by looking at regressions that include control variables (Table A2.19), where we observe that especially women systematically perceived more external help (about one fifth of a standard deviation more), but not more internal help than males (see Table A2.20). If we look at Table 5.6 we see that human capital is again not able to explain the dependent variable, which is the perceived internal help in this case. Financial and social capital however seem to be rather relevant to explain the perception of help by friends, family and neighbors and of about equal importance. According to the results in Table 5.6, increases of financial capital or social capital by one standard deviation roughly correspond to increases in individual perceived internal help by about one tenth of a standard deviation.

I also repeat the same kind of regressions using only observations which stem from high intensity villages. The respective tables can be found in the appendix (Tables A2.27, A2.28, A2.29, A2.30, A2.31, and A2.32). By looking at the tables we can see that the relation between the financial capital indicator and recovery time stays negative and significant, whereas we do not see significant relations between recovery time and the indicator of human capital, or the indicator of social capital. All other relations we found using the complete data-set stay robust when we look at the subset of highly affected individuals only.

Now I want to look at the relation between the components of capital indicators and indicators for resilience a bit in more detail. First and foremost we take a look at the relation between the forms of capital and the time households needed for their houses to be completely repaired after Yolanda. Our expectations were that indicators of human, social, and financial capital are negatively correlated with recovery time (H1a, H2c, H3a). The results of a regression of capital indicators and recovery time are reported in Table 5.7 on page 117. We can observe that the five factor model does not explain much of the variation in recovery time ($R^2 \leq 0.19$) and less explanatory variables than expected seem to be significantly able to explain variations in recovery time. Model (1), which tests the relation

between human capital indicators and recovery time, indicates that individuals with either vocational training or a college degree need around 30 days less to repair their houses than individuals with elementary schooling as the highest educational degree. However, this is only significant on the ten percent level[1] and not robust across different model specifications, such that the significance is lost in the complete model in column (5). Financial capital indicators also only barely explain variation in recovery time in our sample, but we see a significant and robust relation between having to reduce food intake because of a lack of money in a household and the time needed for repairs. Households that reported to have to reduce food because of a lack of money need about 30 days more to repair damages, which is about a fifth of a standard deviation respectively. This observation meets our expectations since it can be the case that households which have no financial reserves, such that they even have to reduce their food intake, may find it harder to mobilize financial resources towards repairs of housing, since food intake is also a fundamental need. Therefore very poor households find themselves at a disadvantage because they do not have the freedom to prioritize reparation efforts and have to stick to put their efforts in satisfying fundamental needs first. Although it is well established in the literature that social capital plays a major role in disaster recovery, we cannot empirically observe this relation in our sample in general. From models (3) and (5) in Table 5.7 on page 117 we can see that only the number of close friends can significantly explain recovery time. An increase in the number of friends by one standard deviation on average leads to declines in recovery time by about a tenth of a standard deviation. Therefore the effect size of increasing network sizes is relatively small. We get a similar picture if we look at the explanatory power of the five factor model on recovery costs (see Table 5.8 on page 118), where only village fixed effects seem to be sufficiently able to explain variation in recovery costs[2].

And how was the time individuals had to prepare for the disaster affected by the forms of capital? We look at this question by looking at the regression results from table 5.9 on page 119. We can observe that while almost none of the variables used in each model are able to explain variation in the time individuals had between they realized a disaster was incoming and actual impact of Yolanda, income is significantly able to explain this variable, but only on the ten percent level. The effect size of the coefficient is also rather small, since the coefficient implies that an increase of income by one standard deviation would lead to an increase in

[1] p=0.053 for vocational training and p=0.084 for college degree

[2] A regression of capital forms on recovery costs without controlling for village fixed effects results in an R^2 between 0.01 and 0.05.

the time an individual had to repair by only about 0.12 standard deviations of the dependent variable. The last part of disaster resilience we are looking at in this regard is the individual perceived affectedness as defined in section 4.2. The results of the regression models on the individual perceived affectedness can be found in Table 5.10 on page 120. We can observe that human capital indicators are not able to significantly explain any variation in individual perceived affectedness. We can however observe some mild significant effect of income on the perception of being affected, since an increase in income by one standard deviation seems to lead to a decrease in perceived affection by about an eighth of a standard deviation. Now have a look at model (3) in Table 5.10 on page 120. From the results of the regression we see that individuals who claimed to be more involved in voluntary work for the community were significantly perceiving themselves more affected. An increase in voluntary work by one standard deviation corresponds to increases in affectedness by about 0.7 standard deviations. This relation is rather unexpected, since we hypothesized that parts of social capital help individuals to reduce their affectedness, whereas we see the opposite relation in this example.

Table 5.11 on page 121 shows the estimates of a regression of capital indicators on the individual perceived level of external help as previously defined in section 4.2. Models (1) and (5) show a positive and significant correlation between having a high school or college degree and/or vocational training with the individual perceived presence of external help, indicating that having a high school (college) degree is linked to an increase in perceived help by about a tenth (two tenths) of a standard deviation in perceived help. The effect of vocational training on the perception of external aid is visible in models (1) and (5) and also roughly corresponds to an increase of perceived aid by roughly a tenth of a standard deviation. Financial capital as well as social capital indicators do not seem to be able to explain variation in perceived help (model(2) and (3)). However, for physical capital we see that households that used heavy materials in their housing were less likely to perceive high levels of help, since we see a negative and significant relation (model (4) and (5)) which corresponds to a decrease in perceived help by about one tenth of a standard deviation. Lastly, Table 5.12 on page 122 shows the output if we use the index for internal help as the dependent variable for the five factor model. Human capital indicators as well as physical indicators do not significantly explain variation in the individual perceived help from friends and family. Financial capital (model (2)) show a significant relation between having liquid savings and receiving help from others, with an effect size about a tenth of a standard deviation and significance on the five percent level, whereas other

financial capital indicators are not able to explain variation in perceived help from friends and family. Unexpectedly, the number of friends shows a negative and significant correlation with help from friends and family, although with an almost negligible effect size, since an increase of the number of friends by one standard deviation corresponds to a decease in perceived internal help by just a twentieth of a standard deviation.

The results from Tables 5.7, 5.8, 5.9, 5.10, 5.11and 5.12 can be summarized as follows: From the literature we expected a clear correlation between all facets of capital forms and indicators for disaster resilience. However, we just explored that this is not the case per se, but that rather differentiated aspects of the capital forms influence disaster resilience through various channels. For example, we expected that human capital is negatively correlated with recovery time and recovery costs, and positively correlated with the time individuals heard about a disaster incoming and the disaster actually making landfall (H1a and H1b) (cf. Wamsler et al., 2012; Drabek, 2013; Muttarak and Pothisiri, 2013; Frankenberg et al., 2013; Sharma et al., 2013). However, looking at the results from the regressions we are not able to reject the respective null hypotheses and therefore it seems that the relative importance of education and being conscientious would be valued too high in our example ex ante. But somewhat surprisingly we could observe a positive relation between the perception of external help and having a higher educational degree. This correlation could hint towards a relation of higher educated individuals being more able to engage help providers and therefore have a higher perception of help in general. Of course this channel is speculative and needs further investigation, since we did not expect such a relation beforehand (see section 2.5).

Next we look at social capital indicators and look at their explanatory power of resilience indicators. Again, we expected that all indicators for social capital were able to explain variation in recovery costs, recovery time, perceived help from others, and the time between individuals realizing a storm was incoming and actual impact (H2a-H2c) (cf. Granovetter, 1983; Nakagawa and Shaw, 2004; Hawkins and Maurer, 2009; Aldrich, 2012b; Drabek, 2013). What we get if we empirically test this relation is that we observe that social capital indicators in general cannot sufficiently explain variation in resilience indicators. However, we do find a negative and significant relation between the number of close friends an individual has and recovery time, as well as significantly increased perceived affectedness by individuals who had higher level of voluntary work in 2012. Furthermore we observe that individuals with higher levels in trust in bonding

elements perceive higher levels of internal help afterward. This relation could stem from the potential of trust to build networks which help in turn to access resources, as we previously hypothesized.

We also explored the relative importance of financial capital on disaster resilience. Our expectations were that financial capital would be also negatively correlated with recovery time, but positively with recovery costs respectively (cf. Clarke and Wallsten, 2003; Skoufias, 2003; Carter et al., 2007; Skoufias, 2007; Macours et al., 2012, 2013; Le Quesne et al., 2017). We see that in our regressions the coefficients for most of the financial capital indicators are not able to explain variation in resilience indicators, with the exception of the reduction of food due to a lack of financial assets and monthly income. We can observe that monthly income seems to be significantly relevant for knowing about the disaster beforehand and self perception of affectedness. I believe that the significant increase in time that people had to prepare for the disaster is driven by higher access to technological means which help to foresee devastating events, such as smartphone applications or general access to the internet (cf. Mark and Semaan, 2008; Mark et al., 2009). However, I cannot substantiate this claim with our data and therefore simply rely on the fact that the coefficient meets our predictions from section 2.3.3 which already made implications about this channel. Not having sufficient financial funds to ensure a stable food intake for a household is also positively correlated with recovery time, which is inline with our expectations since households that have no financial assets a fortiori have not sufficient liquid assets during a crisis, and might therefore find themselves especially vulnerable to destructive disasters. Additionally we observe that individuals with savings perceived that they received more internal help from friends and family than individuals with no savings above $1,000PHP$. At his point I can only speculate why we see this relation. One possible explanation could be that friends and family were sometimes financially compensated for their help at reconstruction and therefore individuals with financial reserves might have been able to mobilize workforces from their bonding networks more easily. Another explanation could be that individuals have some vague idea about the financial reserves of other people and therefore form some sort of reciprocal ties rather with people with financial reserves, hoping to get something in return in the future.

Finally we saw that physical capital indicators (which are admittedly rare in this study) have some degree of explanatory power towards perceived help, which could indicate that external help was primarily provided to homeowners who used primarily light materials. However, we could not find any relation with other

indicators for disaster resilience, such that the relative importance of having heavy materials embedded in a structure seems only to play a minor role in general.

Table 5.7: Effect of five capital forms components on recovery time

	(1)	(2)	(3)	(4)	(5)
High school	-0.03				-0.02
	(0.07)				(0.06)
Vocational training	-0.05*				-0.02
	(0.03)				(0.03)
College	-0.08*				-0.05
	(0.04)				(0.05)
Conscientiousness	0.04				0.05
	(0.04)				(0.05)
Regular income		0.02			0.02
		(0.05)			(0.06)
Monthly income ($*1000PHP$)		-0.01			-0.00
		(0.03)			(0.04)
Savings$\geq 1.000PHP$		-0.08			-0.09
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		0.10			0.10
		(0.06)			(0.07)
Reduced food		0.10**			0.12**
		(0.04)			(0.05)
Trust: institutions			0.09		0.08
			(0.07)		(0.08)
Solidarity			0.02		0.04
			(0.06)		(0.06)
Trust: bonding			-0.09		-0.10
			(0.07)		(0.07)
Trust: general			0.03		0.04
			(0.05)		(0.05)
Club memberships			-0.00		-0.00
			(0.05)		(0.06)
Voluntary work			0.04		0.03
			(0.04)		(0.05)
Household size			0.00		-0.02
			(0.04)		(0.04)
Number of friends			-0.09**		-0.09**
			(0.04)		(0.04)
Barangay kagawat			0.02		0.12
			(0.17)		(0.18)
HH used heavy materials				-0.05	-0.06
				(0.04)	(0.04)
Distance to ocean				0.04	0.04
				(0.03)	(0.04)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.21***	-0.27***	-0.23***	-0.20***	-0.29***
	(0.06)	(0.05)	(0.09)	(0.04)	(0.11)
Observations	433	433	433	430	430
F	2.12	1.95	1.91	2.37	1.32
R^2	0.16	0.18	0.17	0.15	0.20
Adjusted R^2	0.09	0.10	0.09	0.09	0.10

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.8: Effect of five capital forms components on recovery costs

	(1)	(2)	(3)	(4)	(5)
High school	-0.01				0.00
	(0.07)				(0.06)
Vocational training	0.03				0.03
	(0.05)				(0.05)
College	0.00				-0.00
	(0.05)				(0.05)
Conscientiousness	0.04				0.03
	(0.05)				(0.05)
Regular income		-0.03			-0.02
		(0.04)			(0.05)
Monthly income ($*1000PHP$)		0.01			0.02
		(0.05)			(0.05)
Savings$\geq 1.000PHP$		0.03			0.02
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		0.09			0.09
		(0.05)			(0.06)
Reduced food		-0.01			-0.01
		(0.05)			(0.06)
Trust: institutions			0.02		0.03
			(0.04)		(0.05)
Solidarity			0.04		0.03
			(0.07)		(0.07)
Trust: bonding			-0.02		-0.02
			(0.05)		(0.05)
Trust: general			0.06		0.05
			(0.06)		(0.06)
Club memberships			-0.02		-0.04
			(0.04)		(0.04)
Voluntary work			0.01		0.00
			(0.03)		(0.03)
Household size			0.01		0.01
			(0.04)		(0.04)
Number of friends			-0.04		-0.03
			(0.03)		(0.03)
Barangay kagawat			0.06		-0.01
			(0.16)		(0.16)
HH used heavy materials				0.04	0.02
				(0.05)	(0.04)
Distance to ocean				0.01	0.01
				(0.01)	(0.02)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.43	0.46	0.45	0.44	0.44
	(0.35)	(0.34)	(0.33)	(0.35)	(0.34)
Observations	445	445	445	445	445
F	5.69	5.30	4.88	5.90	3.96
R^2	0.25	0.26	0.26	0.25	0.27
Adjusted R^2	0.19	0.20	0.19	0.20	0.18

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.9: Effect of five capital forms components on time individuals had to prepare for impact

	(1)	(2)	(3)	(4)	(5)
High school	-0.03				-0.03
	(0.06)				(0.06)
Vocational training	-0.02				-0.04
	(0.04)				(0.05)
College	0.04				0.01
	(0.06)				(0.06)
Conscientiousness	0.04				0.02
	(0.05)				(0.05)
Regular income		0.03			0.03
		(0.05)			(0.06)
Monthly income ($*1000PHP$)		0.12*			0.12*
		(0.07)			(0.07)
Savings$\geq$ 1.000PHP		-0.07			-0.07
		(0.05)			(0.05)
Debt$\geq$ 5.000PHP		0.06			0.05
		(0.06)			(0.06)
Reduced food		-0.02			-0.01
		(0.04)			(0.05)
Trust: institutions			0.00		0.01
			(0.06)		(0.06)
Solidarity			0.02		0.01
			(0.05)		(0.06)
Trust: bonding			0.01		0.00
			(0.06)		(0.06)
Trust: general			0.03		0.03
			(0.05)		(0.05)
Club memberships			-0.01		-0.05
			(0.05)		(0.05)
Voluntary work			0.06		0.05
			(0.04)		(0.04)
Household size			0.01		-0.01
			(0.05)		(0.05)
Number of friends			-0.01		-0.01
			(0.03)		(0.04)
Barangay kagawat			0.15		0.04
			(0.16)		(0.20)
HH used heavy materials				0.08	0.06
				(0.06)	(0.07)
Distance to ocean				-0.00	0.01
				(0.03)	(0.03)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.32***	-0.29***	-0.33***	-0.32***	-0.31**
	(0.11)	(0.09)	(0.11)	(0.09)	(0.13)
Observations	446	446	446	446	446
F	1.61	1.90	1.53	1.66	1.15
R^2	0.05	0.07	0.06	0.05	0.08
Adjusted R^2	-0.02	-0.01	-0.03	-0.02	-0.04

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.10: Effect of five capital forms components on individual perceived affectedness

	(1)	(2)	(3)	(4)	(5)
High school	-0.02				-0.02
	(0.05)				(0.05)
Vocational training	0.02				0.04
	(0.04)				(0.04)
College	0.04				0.04
	(0.04)				(0.04)
Conscientiousness	0.02				-0.01
	(0.04)				(0.04)
Regular income		0.00			-0.03
		(0.04)			(0.04)
Monthly income ($*1000PHP$)		-0.06			-0.09**
		(0.04)			(0.04)
Savings$\geq 1.000PHP$		0.04			0.06
		(0.04)			(0.04)
Debt$\geq 5.000PHP$		0.03			0.02
		(0.04)			(0.05)
Reduced food		-0.03			-0.02
		(0.04)			(0.04)
Trust: institutions			0.07		0.07
			(0.04)		(0.04)
Solidarity			-0.05		-0.06
			(0.04)		(0.04)
Trust: bonding			0.04		0.05
			(0.04)		(0.04)
Trust: general			-0.01		-0.02
			(0.04)		(0.04)
Club memberships			0.05		0.06
			(0.05)		(0.05)
Voluntary work			0.06*		0.07**
			(0.03)		(0.03)
Household size			0.02		0.03
			(0.04)		(0.04)
Number of friends			-0.00		0.00
			(0.02)		(0.02)
Barangay kagawat			-0.01		0.00
			(0.12)		(0.13)
HH used heavy materials				-0.02	-0.02
				(0.04)	(0.04)
Distance to ocean				-0.02	-0.00
				(0.05)	(0.06)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.11	0.12	0.07	0.11	0.07
	(0.22)	(0.22)	(0.22)	(0.22)	(0.23)
Observations	446	446	446	446	446
F	12.60	11.92	11.47	12.62	9.94
R^2	0.42	0.42	0.43	0.42	0.44
Adjusted R^2	0.37	0.37	0.38	0.37	0.38

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.11: Effect of five capital forms components on perceived external help

	(1)	(2)	(3)	(4)	(5)
High school	0.11**				0.12**
	(0.05)				(0.05)
Vocational training	0.06				0.08*
	(0.05)				(0.05)
College	0.13**				0.14**
	(0.05)				(0.06)
Conscientiousness	0.02				0.00
	(0.05)				(0.05)
Regular income		-0.00			-0.03
		(0.05)			(0.05)
Monthly income ($*1000PHP$)		-0.01			-0.03
		(0.04)			(0.04)
Savings$\geq 1.000PHP$		0.02			0.03
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		0.02			0.04
		(0.04)			(0.05)
Reduced food		-0.04			-0.04
		(0.05)			(0.05)
Trust: institutions			0.07		0.06
			(0.05)		(0.05)
Solidarity			-0.07		-0.05
			(0.05)		(0.05)
Trust: bonding			0.06		0.07
			(0.05)		(0.05)
Trust: general			-0.03		-0.02
			(0.04)		(0.04)
Club memberships			0.04		0.02
			(0.05)		(0.05)
Voluntary work			-0.05		-0.05
			(0.04)		(0.05)
Household size			0.02		0.03
			(0.04)		(0.04)
Number of friends			0.03		0.03
			(0.02)		(0.03)
Barangay kagawat			0.09		0.11
			(0.15)		(0.17)
HH used heavy materials				-0.10**	-0.11**
				(0.04)	(0.05)
Distance to ocean				-0.06	-0.04
				(0.05)	(0.06)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.25	0.35	0.23	0.31	0.18
	(0.21)	(0.21)	(0.22)	(0.21)	(0.23)
Observations	446	446	446	446	446
F	6.29	5.74	5.99	6.44	5.74
R^2	0.27	0.25	0.27	0.26	0.30
Adjusted R^2	0.21	0.19	0.20	0.21	0.21

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.12: Effect of five capital forms components on perceived internal help

	(1)	(2)	(3)	(4)	(5)
High school	0.08				0.08
	(0.06)				(0.06)
Vocational training	0.01				0.03
	(0.05)				(0.05)
College	0.06				0.06
	(0.06)				(0.06)
Conscientiousness	0.04				0.01
	(0.05)				(0.05)
Regular income		0.04			0.05
		(0.05)			(0.06)
Monthly income ($*1000PHP$)		-0.04			-0.06
		(0.05)			(0.05)
Savings$\geq 1.000PHP$		0.12**			0.14**
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		-0.01			-0.01
		(0.05)			(0.05)
Reduced food		-0.01			-0.03
		(0.06)			(0.06)
Trust: institutions			-0.01		-0.00
			(0.06)		(0.06)
Solidarity			0.01		0.01
			(0.06)		(0.06)
Trust: bonding			0.13**		0.13**
			(0.05)		(0.05)
Trust: general			-0.02		-0.04
			(0.05)		(0.05)
Club memberships			0.09*		0.07
			(0.05)		(0.06)
Voluntary work			-0.02		-0.02
			(0.04)		(0.04)
Household size			0.02		0.04
			(0.05)		(0.05)
Number of friends			-0.06*		-0.07*
			(0.03)		(0.03)
Barangay kagawat			-0.21		-0.29*
			(0.16)		(0.16)
HH used heavy materials				-0.03	-0.01
				(0.05)	(0.06)
Distance to ocean				-0.05	-0.04
				(0.06)	(0.06)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.26	0.31	0.40*	0.31	0.34
	(0.22)	(0.21)	(0.23)	(0.21)	(0.23)
Observations	446	446	446	446	446
F	1.22	1.44	1.51	1.16	1.66
R^2	0.07	0.08	0.09	0.07	0.12
Adjusted R^2	-0.00	0.00	0.01	-0.00	0.01

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.1.1 Performance of capital clusters

In this subsection we will investigate whether we can find differences in the performance of clusters which are endowed differently with three types of capital, namely human, financial and physical capital[3]. We use clusters which we constructed as a result of cluster analysis which was described in sub-section 4.5. We begin by looking at the mean performance of each cluster for each indicator for disaster resilience which we use in this study. We explore the relation between clusters of capital to see if we can derive a certain combination of capital which was especially effective in disaster resilience indicators. We begin by looking at mean values for each resilience indicator per cluster, and if those proxies differed significantly between clusters, for which we use a two sided t-test. Figure 5.1 graphically represents the differences in performance for the different clusters in capital endowment in recovery time, recovery costs, time that was left to react, individual perceived affectedness, perceived external help, and perceived internal help. We can observe from the figure that all clusters perform quite similarly in general with respect to resilience indicators. There are only some exceptions where the graphic implies significant differences: In the case of time until impact and individual perceived affectedness. We take a closer look at differences in performance by looking at mean comparison tests between each cluster. We look at the differences between the clusters in a bit more detail in Table 5.13, which shows summary statistics of each cluster regarding performance in resilience indicators and the result of a two sided t-test between each cluster. We can observe that by purely looking at mean differences the first cluster, which represents the one with very low human capital and a bit below average social and financial capital. Cluster two, which represents the cluster of individuals with relatively high human and social capital and comparably low financial capital, performs almost half as good as cluster one in recovery speed. At the same time, cluster two performs almost thrice as bad as cluster three in recovery time and also perceives itself on average more affected than cluster three. Cluster three and cluster one do not perform significantly different in neither of the resilience indicators. These results so far present findings which are completely against our expectations, since we expected at least that more of each form of capital would lead to better performance in disaster resilience indicators, but cluster one, which is endowed weakly with financial and especially human capital, seems to perform comparably

[3] I advise the reader to have Table 4.9 and Figure 4.10 somewhere nearby while reading this sub-section, which should help to get a better feeling for the clusters and the respective results which we find.

good to the other two clusters. Moreover, we see almost half the recovery time for cluster one compared to cluster two, while it has less human and social capital than cluster two. The cluster with the least recovery time is also the one with the most financial capital and a bit above average human capital. However, it does not perform significantly better than cluster one, which is relatively poorly endowed with all kinds of capital. We test whether or not these findings hold in a OLS regression controlling for village fixed effects and therefore for unobserved co-variates that are related to typhoon exposure. Tables 5.14, A2.39 and A2.40 show the results of these regressions. When we look at the tables we can see that most relations that we previously found via mean comparison testing are no longer significant when we control for village fixed effects in a multivariate regression. About the only striking thing we observe is that all clusters apparently perform differently from each other with regard to their respective recovery time. We can see that clusters one and two both need substantially more time to recover than cluster three, namely between 25 (cluster one) and 55 (cluster 2) days. Additionally, cluster two needed about one month longer than cluster one, which is again completely against our expectations. So could a combination of strongly developed human and social capital be a potentially promising channel to foster a faster recovery after disaster? If so, then we would observe that cluster two had faster recovery rates than cluster one, which is not the case, so this presumption does not seem plausible any longer. Could it be that human capital in fact has the potential to foster a faster recovery, but is in need for sufficient financial funds to do so? This explanation seems more plausible, since we observe significantly faster recovery rates of cluster three, which is similarly endowed with human capital as cluster two, but is substantially better endowed with financial capital. Therefore it seems appropriate to conclude that especially financial capital plays a major role regarding recovery after a disaster.

5.1.2 Multicollinearity and robustness

Since the five forms of capital are linked to each other our estimations could have a higher probability of type two error, since our explanatory variables may be collinear. Therefore I check whether the OLS estimations are sufficiently efficient by using auxiliary regressions on all explanatory variables and check how well they explain each other. The results of these auxiliary regressions can be found in tables A2.10, A2.11, A2.12, A2.13, and A2.14 in the Appendix. All of these auxiliary regressions result in a variance inflated factor of below 1.5, indicating that collinearity should play no major role for the efficiency of our estimators

Table 5.13: Mean performance in disaster resilience indicators of clusters of capital endowment

	clusters			mean comparison tests p-values		
	Cluster 1	Cluster 2	Cluster 3	1 vs. 2	2 vs. 3	1 vs. 3
Recovery time	36.01	68.66	21.01	0.061*	0.031**	0.322
	(126.26)	(188.20)	(64.91)			
Recovery costs	5,862.22	7,537.02	8,893.95	0.276	0.588	0.155
	(11,797.08)	(16,421.00)	(22,234.91)			
Time until impact	7.75	6.79	9.10	0.475	0.223	0.449
	(11.90)	(13.09)	(15.65)			
Individual perceived affectedness	3.30	3.76	3.33	0.015**	0.083*	0.897
	(1.62)	(1.91)	(1.75)			
Perceived external help	0.28	0.32	0.32	0.119	0.923	0.233
	(0.22)	(0.27)	(0.27)			
Perceived internal help	0.32	0.29	0.32	0.857	0.373	0.279
	(0.27)	(0.27)	(0.32)			
n	179	169	81			

Table 5.14: Effect of different combinations of capital endowment on performance in resilience, baseline=cluster 1

	(1)	(2)	(3)	(4)	(5)	(6)
	Time of repairs	Costs of repairs	Time until impact	Perceived affected-ness	Perceived external help	Perceived internal help
Cluster 2	29.57	219.58	-0.13	0.05*	0.01	-0.01
	(18.49)	(1706.79)	(1.43)	(0.03)	(0.02)	(0.03)
Cluster 3	-25.27*	2461.74	1.70	0.01	0.03	0.03
	(13.75)	(2314.86)	(2.05)	(0.03)	(0.03)	(0.04)
Distance to ocean	6.88	128.65	0.05	0.01	-0.02	-0.01
	(4.97)	(220.67)	(0.45)	(0.01)	(0.01)	(0.02)
HH used heavy materials	-5.67	718.56	0.94	-0.01	-0.03***	-0.01
	(5.53)	(769.62)	(0.76)	(0.01)	(0.01)	(0.01)
Village fixed effects	yes	yes	yes	yes	yes	yes
Constant	0.04	13659.78**	3.46**	0.40***	0.37***	0.37***
	(14.65)	(5836.08)	(1.66)	(0.06)	(0.06)	(0.06)
Observations	411	425	426	426	426	426
F	1.80	5.17	1.48	10.77	6.65	1.26
R^2	0.17	0.26	0.05	0.43	0.28	0.07
Adjusted R^2	0.10	0.19	-0.03	0.38	0.22	-0.00

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

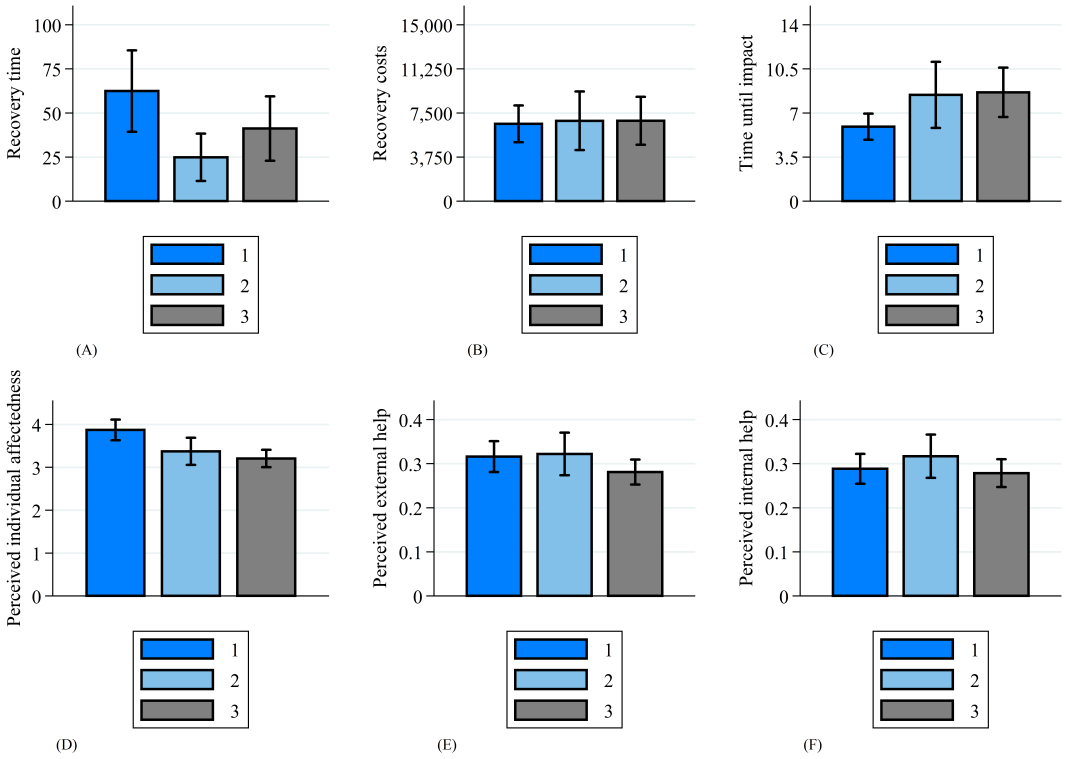


Figure 5.1: Performance of each cluster of capital endowment on different resilience indicators; part (A): differences in recovery time; part (B): differences in recovery costs; part (C): differences in time unil impact; part (D): differences in individual perceived affectedness; part (E): differences in perceived external help; part (F): differences in perceived internal help

since traditionally one would only speak of a high problem with collinearity if the variance inflated factor is above 10 (c.f. Hayo, 2018). Additionally I check whether blocks of explanatory variables have sufficient explanatory power using F-tests for joint significance. The strategy I followed consists of testing all variables for joint significance which showed no singular significance on their own. All of the resulting tests rejected the hypothesis that tested bundles of variables are jointly explaining variation in the dependent variable significantly. To check whether or not the results which we found survive in different model specifications, I tried to use more efficient modeling by simply using all variables which showed significance for each complete model (model (5) for each dependent variable, see tables A2.10, A2.11, A2.12, A2.13, and A2.14), and by executing a general to specific algorithm (see Hoover and Perez, 1999; Clarke, 2014) to see whether the results hold accross these different specified models. The results of the resulting regressions can be found in Table 5.15 on page 128. If we look at the time needed for repairs on houses (models (1) and (2)), we observe that the effect of households having to reduce meals due to a lack of liquid financial assets survives both

model specifications and varies between about a fourth and a third of a standard deviation increase in recovery time. Although a general to specific algorithm concludes that conscientiousness and having a college degree also explain quite a substantial bit of variation in the time needed for repairs, I am hesitant to interpret too much into variables that "survive" the general to specific algorithm despite not being significant beforehand, since the algorithm also excludes parts of village fixed effects and therefore might miss some critical information. Therefore I use the general to specific algorithm rather to check whether or not variables that were significant before "survive" the algorithm, and would not interpret much on the resulting models. Next we look at variables that may or may not explain recovery costs. Although none of the selected capital indicators showed significance for explaining recovery costs, having debt above $5,000PHP$ was not still the variable with the lowest p-value and I therefore check what happens if we include it solely into a model. Despite significantly explaining recovery costs (model(3)) it does not survive the general to specific algorithm (model(5)). If we continue with looking at model (5) and (6) we can observe that the effect of monthly household income on the time between individual's realizing that a disaster was incoming and the actual time of impact does survive the general to specific algorithm, and therefore I will consider this finding robust. Next we look at models (7) and (8) and conclude that trust in institutions seems to robustly explain variation in individual perceived affectedness. The perception of external help seems to be robustly explained by households having used heavy materials for their housing (models (9) and (10)). Furthermore, the variables which explained internal help significantly also survive different model specifications (models (11) and (12)).

Since the degree of heterogeneity in exposure is quite substantial, but is clustered in two kinds of extremes, I also want to take a closer look at the sub-sample of highly affected individuals to check whether some results may be dampened due to a lack of variation in affectedness in low intensity areas, and therefore meet concerns that the results may not be representative for a general population, since we actually look at two sub-populations: lowly affected islanders and highly affected islanders. Therefore I check whether the results we see in previous regressions hold if we exclude low intensity area inhabitants from our sample. The results of these regressions can be found in Tables A2.27, A2.33, A2.28, A2.34, A2.29, A2.35, A2.30, A2.36, A2.31, A2.37, A2.32, and A2.38 in the Appendix. What we observe is that the effect of financial capital on recovery time stays robust and even gains effect size when we look at the sub-population of highly affected villagers, and additionally we can observe that households further away from the

Table 5.15: More efficient and general to specific modeling for all dependent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Time of repairs	Time of repairs	Costs of repairs	Costs of repairs	Time until impact	Time until impact	Affected-ness	Affected-ness	Ext. help	Ext. help	Int. help	Int. help
High school									0.11**			
									(0.05)			
Vocational training							0.02*		0.08*			
							(0.01)		(0.05)			
College		-0.07***					0.03***	0.02**	0.14***			
		(0.02)					(0.01)	(0.01)	(0.05)			
Conscientiousness		0.10**										
		(0.04)										
Monthly income (∗1000PHP)					0.12*	0.12**	-0.01					
					(0.06)	(0.06)	(0.01)					
Savings≥ 1.000PHP											0.13***	0.13***
											(0.05)	(0.05)
Debt≥ 5.000PHP			0.09*									
			(0.05)									
Reduced food	0.13***	0.14***										
	(0.04)	(0.04)										
Trust: institutions							0.03***	0.03**				
							(0.01)	(0.01)				
Trust: bonding											0.14***	0.14***
											(0.05)	(0.04)
Number of friends	-0.09**										-0.06*	
	(0.04)										(0.03)	
Barangay kagawat											-0.20	
											(0.15)	
HH used heavy materials									-0.11**	-0.10**		
									(0.04)	(0.04)		
Distance to ocean												
vil2	-0.02		-0.90***	-0.90***	0.52**		-0.20***	-0.14***	-1.05***	-0.83***	-0.77***	-0.49***
	(0.06)		(0.34)	(0.12)	(0.25)		(0.08)	(0.05)	(0.25)	(0.13)	(0.28)	(0.17)
vil3	0.63*		-0.26		0.08		-0.02		-0.21		-0.35	
	(0.37)		(0.45)		(0.15)		(0.10)		(0.37)		(0.40)	
vil4	0.03		-0.86**	-0.83***	0.24		-0.11		-0.66**	-0.38**	-0.25	
	(0.07)		(0.35)	(0.12)	(0.18)		(0.07)		(0.27)	(0.17)	(0.28)	
vil5	0.29		-0.09		-0.01		0.24***	0.31***	0.09		-0.14	
	(0.19)		(0.47)		(0.10)		(0.07)	(0.04)	(0.30)		(0.32)	
vil6	0.06		-0.89***	-0.89***	0.34		-0.16		-0.85***	-0.56**	-0.38	
	(0.09)		(0.34)	(0.12)	(0.30)		(0.10)		(0.31)	(0.23)	(0.41)	
vil7	0.01		-0.91***	-0.88***	0.39		-0.06		-0.62		0.32	
	(0.08)		(0.35)	(0.12)	(0.35)		(0.10)		(0.43)		(0.40)	
vil8	0.11		-0.45	-0.41**	0.60		0.17**	0.23***	-0.35		-0.13	
	(0.17)		(0.37)	(0.17)	(0.58)		(0.09)	(0.06)	(0.31)		(0.33)	
vil9	0.94***		-0.02		0.21		0.36***	0.40***	0.76**	0.88***	-0.30	
	(0.35)		(0.38)		(0.23)		(0.09)	(0.06)	(0.31)	(0.22)	(0.32)	
vil10	0.37*		-0.05		0.06		0.12	0.17***	-0.07		-0.54*	
	(0.19)		(0.41)		(0.12)		(0.09)	(0.06)	(0.30)		(0.30)	
vil11	-0.05	-0.35***	-0.83**	-0.86***	0.39		-0.15		-0.22		-0.50	
	(0.07)	(0.09)	(0.34)	(0.12)	(0.25)		(0.09)		(0.49)		(0.49)	
vil12	-0.00		-0.82**	-0.88***	0.92**		-0.18**	-0.11**	-0.48		-0.33	
	(0.07)		(0.33)	(0.12)	(0.44)		(0.08)	(0.06)	(0.43)		(0.40)	
vil13	-0.09**	-0.40***	-0.78**	-0.81***	0.16		-0.18**	-0.12***	-0.66**	-0.43**	-0.26	
	(0.05)	(0.08)	(0.33)	(0.12)	(0.14)		(0.07)	(0.04)	(0.29)	(0.20)	(0.32)	
vil14	-0.02		-0.79**	-0.84***	0.25*		-0.17**	-0.11**	-0.68**	-0.48**	-0.71**	-0.43**
	(0.06)		(0.33)	(0.13)	(0.15)		(0.08)	(0.05)	(0.29)	(0.20)	(0.29)	(0.19)
vil15	0.99**		0.30		0.51		0.35***	0.40***	0.18	0.43**	-0.61**	-0.41**
	(0.49)		(0.63)		(0.46)		(0.09)	(0.06)	(0.30)	(0.21)	(0.29)	(0.19)
vil16	0.19		-0.26		0.13		0.01		0.23		-0.11	
	(0.13)		(0.40)		(0.24)		(0.09)		(0.32)		(0.34)	
vil17	0.02	-0.30***	-0.69**	-0.71***	0.29		-0.11		-0.64**	-0.50***	-0.36	
	(0.07)	(0.10)	(0.34)	(0.14)	(0.22)		(0.08)		(0.25)	(0.14)	(0.29)	
vil18	0.05		-0.84**	-0.89***	0.37		-0.17*		-0.40		-0.15	
	(0.08)		(0.33)	(0.12)	(0.24)		(0.10)		(0.43)		(0.41)	
vil19	0.86		1.21		0.11		0.16	0.21***	0.41	0.61***	-0.20	
	(0.58)		(0.88)		(0.16)		(0.10)	(0.08)	(0.29)	(0.20)	(0.32)	
vil20	0.05		-0.63*	-0.64***	0.38		-0.03		-0.25		-0.08	
	(0.06)		(0.35)	(0.14)	(0.26)		(0.09)		(0.29)		(0.35)	
vil21	0.36		-0.66*	-0.65***	0.51		-0.04		-0.40		-0.37	
	(0.43)		(0.35)	(0.14)	(0.46)		(0.10)		(0.29)		(0.33)	
vil22	1.50***	1.17**	0.90**	0.86***	-0.07		0.32***	0.38***	0.81**	0.99***	-0.32	
	(0.57)	(0.55)	(0.43)	(0.30)	(0.10)		(0.08)	(0.06)	(0.36)	(0.30)	(0.36)	
vil23	0.72		-0.47	-0.50***	0.35		0.02		-0.16		-0.41	
	(0.49)		(0.36)	(0.18)	(0.25)		(0.09)		(0.29)		(0.32)	
vil24	0.07		-0.86**	-0.88***	0.41*		-0.24***	-0.17***	-0.84***	-0.54**	-0.56*	
	(0.08)		(0.33)	(0.12)	(0.21)		(0.08)	(0.05)	(0.31)	(0.23)	(0.32)	
vil25	1.09*		-0.35		0.07		0.05		-0.26		-0.56*	
	(0.57)		(0.40)		(0.15)		(0.08)		(0.35)		(0.33)	
vil26	0.02		-0.81**	-0.81***	0.62**		-0.17**	-0.12***	-0.96***	-0.82***	-0.34	
	(0.08)		(0.35)	(0.13)	(0.25)		(0.07)	(0.03)	(0.28)	(0.18)	(0.39)	
vil27	0.03		-0.88***	-0.90***	0.49*		-0.14		-0.08		-0.52	
	(0.08)		(0.34)	(0.12)	(0.29)		(0.09)		(0.51)		(0.42)	
vil28	0.02		-0.87**	-0.87***	0.14		-0.27***	-0.21***	-0.58*		-0.85***	-0.56***
	(0.07)		(0.34)	(0.12)	(0.19)		(0.08)	(0.05)	(0.32)		(0.28)	(0.17)
vil29	0.28**		-0.29		0.18		0.40***	0.45***	0.95***	1.10***	0.22	
	(0.14)		(0.36)		(0.28)		(0.10)	(0.08)	(0.31)	(0.22)	(0.38)	
vil30	0.04		-0.87***	-0.90***	0.47		-0.11		-0.51		-0.44	
	(0.08)		(0.33)	(0.12)	(0.35)		(0.08)		(0.32)		(0.34)	
Constant	-0.27***	0.01	0.44	0.45***	-0.29***	-0.00	0.41***	0.35***	0.26	0.04	0.37*	0.07
	(0.05)	(0.05)	(0.34)	(0.12)	(0.09)	(0.05)	(0.06)	(0.02)	(0.21)	(0.06)	(0.22)	(0.05)
Observations	433	433	445	445	446	446	446	446	446	446	446	446
F	2.11	5.27	5.89	.	1.98	4.10	12.61	22.40	7.02	13.67	2.17	6.21
R^2	0.17	0.07	0.26	0.20	0.06	0.01	0.45	0.42	0.28	0.24	0.10	0.06
Adjusted R^2	0.11	0.06	0.21	0.16	-0.01	0.01	0.40	0.39	0.22	0.21	0.03	0.05

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Models (1), (3), (5), (7), (9), and (11) show the results of more efficient modeling using only significant variables from previous estimations.

Models (2), (4), (6), (8), (10), and (12) show models which contain variables that "survive" a general to specific modeling algorithm.

The variables "vil1"-"vil30" are village dummies.

shoreline were also able to recover more quickly. If we look at the more detailed version of the regression model, we see that the significance of a reduction in meals due to a lack of financial assets is no longer significantly explaining recovery time in the high intensity villages, although having debt above $5,000PHP$ becomes significant (see Table A2.33). Although the effect of a reduction in meals is not robust in the sub-sample, the interpretation of the results stays quite similar, namely that individuals with a lack of financial opportunities may be less likely to be able to invest in the recovery of their housing, if liquid financial assets are not available. Hence the conclusion remains similar, namely that financial capital (or more specifically: financial opportunities) may play a more important role in disaster recovery than is usually argued in related literature. The results for recovery costs stay the same if we look at the sub-sample and use broader capital measures for model specification (see Table A2.28) and also if we look at the corresponding more detailed model which uses the components for each capital form (Table A2.34), whereas also individuals with debt higher than $5,000PHP$ had significantly higher recovery costs. Tables A2.29 and A2.35 show if the results regarding the effect of the different forms of capital hold if we look at the sub-sample only. We can observe that individuals who lived closer to the shoreline had a tendency to report that they knew earlier that a devastating storm was incoming, if they were from high intensity villages. The finding that higher monthly income is associated with faster reaction times is also no longer true if we look at the results for the sub-sample (Table A2.35). Individual perceived affectedness remains to be positively and significantly influenced by social capital (Table A2.30), but is no longer driven by trust in institutions or educational attainment in the sub-sample (Table A2.36). External help is also not significantly explained by households being equipped with heavy materials in their structure, but rather financial and social capital seem to play a more important role in high intensity villages (Table A2.31), whereas Table A2.37 still shows a positive relation between having used heavy materials and additionally shows a positive and significant relation of the perception of external aid and the reduction of meals due to a lack of financial assets. Therefore signs of targeting external help towards more vulnerable groups by external actors seem to remain. In Table A2.32 we see that the significance of social capital to explain internal help drops, and only the significance of financial capital remains in high intensity villages. Therefore it seems that being in a better financial position has mattered more to gain help from internal networks than social capital, and additionally we see from Table A2.38 that the higher the number of friends in 2012 was, the lower the perceived internal help. This

combined seems to hint towards the suspicion that the role of social capital in disaster resilience could be worthwhile to reinterpret.

We conclude this section by summarizing the results we obtained from the regression models that stayed robust and interpret them in the general context of this thesis. Table 5.16 visualizes the relations that we could not reject through hypothesis testing and also those which just barely failed one of the robustness tests. Probably the most striking observation is that financial capital remains a robust explanatory factor for recovery time, meaning that financially better off households found it easier to recover from the disaster, which is quite straight forward and inline with our expectations. Additionally, we observe that individuals who had to reduce food intake because of a lack of money needed significantly more time to repair their houses than individuals who had not that kind of worry. Households which had to reduce food intake due to a lack of money took between 30 and 40 days more on average to repair their houses than households who did not reduce food intake. This corresponds roughly to an effect size between a fifth and a third of a standard deviation in time needed for repairs. As previously presumed, this effect might stem from the inability of individuals with lacking liquid assets to allocate resources towards disaster recovery, since they probably struggle with the fulfillment of more fundamental needs, such as nutrition. Therefore very poor households might find themselves at a severe relative disadvantage than other villagers, since the destruction of their houses could lead them into some kind of poverty trap (c.f. Carter et al., 2007). Hence stakeholders that take part in disaster relief efforts should keep in mind that some individuals might need more help than others (relatively speaking) and that an egalitarian distribution of relief goods might still leave some parts of the population at a severe relative disadvantage. However what is striking is that we do not observe that people relatively well endowed with social capital found it easier to recover more quickly, but still contrary we find that people with larger networks tended to have less recovery time needed than individuals with smaller social networks. Costs of repairs could not be explained by our observed measures for the capital forms. This hints towards that investments in the five forms of capital were not able to decrease the sensitivity of the affected households towards this kind of strong tropical typhoon. Hence investments to decrease recovery time seem more fruitful due to this results than investments in decreasing household sensitivity. Additionally, none of our indicators robustly explain the time between individuals realizing a storm would hit their homes and actual impact. Although we do observe that income could be related to the time individuals have between realizing a storm

would hit the island and the actual impact of Yolanda. We previously argued that this relation might exist since financially better endowed individuals might have better access to technological means which help them to attain information beforehand (cf. Mark and Semaan, 2008; Mark et al., 2009). However, this relation seems relatively weak since an increase in 2012 income by one standard deviation ($\sim 3,600PHP$ corresponds to roughly an increase in the time individuals had to prepare about 12% of a standard deviation ($\sim 1.1hours$). When we look at the sub-sample of highly individuals only, it seems like individuals that lived closer to the shore realized that their homes were at risk later than individuals further away from the shore, which means that individuals who were even more sensitive to the disaster due to their closer distance to the water found it probably harder to accept that something devastating was coming. When we look at the individual perceived affectedness, only social capital seems to robustly explains variation, where an increase in social capital by one standard deviation is associated with an increase in perceived affectedness by about 0.03 standard deviations, which is according to common rule of thumbs a rather small effect size (c.f. Sawilowsky, 2009). Apart from social capital, educational variables are weakly robust towards different model specifications and positively explain individual perceived affectedness, whereas income shows a negative relation with perceived affectedness. Regarding external and internal help, we can observe from our regression results that it was likely that individuals with higher social capital received more help from external actors, whereas with regard to internal help, the results are a little contradictory. While individuals with higher trust towards bonding elements did receive more help from others, also individuals with larger networks perceived less help. This could mean that people had higher expectations from others if their network size was larger and that the perception of less internal help is a result of frustration since those expectations have not been met. To summarize, we can say that financial capital played a larger role with regard to the recovery time of households, which hints towards the assumption that financial possibilities are more important for disaster recovery than social bonds. However, we also have to acknowledge that social capital significantly increases perceived external and internal help from others, which in term results in a sense of protection from others in times of need, which in turn is also a part of life quality in a social structure. If those social safety nets fail to function after crisis, the resulting frustration by stakeholders may be a critical factor regarding sustainable and cooperative living conditions.

Admittedly, the framework for disaster resilience which we used as an application

Table 5.16: Robust relations between explanatory and dependent variables and corresponding approximate effect sizes

of the DFID framework for sustainable community development in the context of disaster resilience offered by Mayunga (2007) in section 2.2 seems to fail in many regards if we test the underlying relations empirically. Human capital indicators were neither able to explain households capacity to realize threats and take action, nor the speed or the efficiency of disaster recovery (c.f. Table 5.16 and Figure 2.7). Therefore I reject H1a and H1b and accept that there seems to be no relation between individual ability, or psychological capacity of a person to significantly avoid disaster exposure, nor foster disaster recovery in a meaningful manner. Social capital also was not able to explain households ability to avoid or earlier react to the disaster as previously assumed, but shows definitely potential for increasing the amount of help received by external ind internal actors, although this increase in help did apparently not lead to significantly better recovery times, nor significantly less recovery costs. Especially trust seems to play a major role with regard to help from friends, family and neighbors, which shows that tight and closely connected social networks have the potential to alleviate psychological pressure from disaster victims. Hence we cannot completely reject H2a, since we do observe significant relations between social capital indicators and perceived external and internal help, whereas we have to acknowledge that not all parts of social capital work in the same way as we expected. We can see this again by looking at the relation between the number of close friends and perceived internal help, which indicates that frustration with low engagement from large networks to help individuals with large number of friends was at play. However, we have to reject H2b and H2c, since we see no noteworthy relation between Social capital indicators and the time people had to react, nor recovery time and recovery costs. We even observe that people with larger networks tended to have longer recovery times than others, indicating that large social networks may not be the holy grail in increasing disaster resilience as one might presume (c.f. Table 5.16 and Figure 2.9). Regarding financial capital, we can only partly reject H3a, since we do see a robust relation between financial capital and recovery, meaning that financially better endowed households probably were better able to seize opportunities and to repair their homes in a quicker manner. Additionally we see a weakly robust positive relation between a lack of financial funding for food and recovery time, which means that especially financially worse off individuals tend to have higher recovery times and targeting disaster relief towards financially disadvantaged households might be a promising channel to decrease recovery times of communities on average. Although our results point into the direction that disaster resilience is clearly a multi-faceted problem, we do see that financial

capital seems to be the most promising candidate for in investing in more effective disaster recovery, whereas our framework fails to provide a more holistic view on disaster resilience. Hence we need further investigate the matter what the most effective channels to alleviate damages are on the individual level, and how we can develop policies to alleviate costs that arise from exposure to natural disasters.

5.1.3 Financial coping strategies

At one point in 2012, we asked participants if they have experienced certain shocks in the last two years (between 2010 and 2012). They openly told us if they either were affected by illness or accident, death of a family member, bad weather conditions heavily affecting agricultural or fishing activity, bad weather conditions affecting their own property, or other shocks. About 62% (n=499) said that a family member was ill during that time, 27% (n=220) had a death incident in their family, 64% (n=518) said that bad weather conditions were affecting their agricultural or fishing activities, and 48% (n=387) said that their property was affected by bad weather conditions. Following that part of the survey, we let participants rank financial coping mechanisms which they used if they were harmed by a shock according to their importance.

When we look at how they usually cope with such dramatic events financially, the top ranked mechanism is using their own savings to cope with the situation. The second most important financial coping mechanism seems to be to borrow money from other villagers, while the third most important mechanism seems to be to reduce the consumption of goods. Thereby we clearly see a pattern of how individuals usually cope with shocks - first they use all their financial liquid assets, then they try to borrow money, and finally they tend to reduce their consumption. This prioritization of financial coping mechanism seems quite clearly established when we look at how participants ranked the relative importance of financial coping mechanisms (see Table 5.17). Therefore we can say with some degree of confidence that insurance or other substitutes for liquid financial assets did not play a major role in the minds of our participants to cope with socks.

5.1.4 Income and using sturdier materials for housing

Were financially well endowed individuals affording better housing and therefore more resistant against disaster exposure? I look at this question by correlating the available financial resources in 2012 with the materials people used for their housing before the storm. As we can see from Table A2.8, financial income seems to correlate quite well with more stable materials, whereas there is a negative

Table 5.17: Coping strategies regarding shocks between 2010 and 2012

	Illness of a family member	Death of a family member	Bad weather conditions affecting agricul-ture/fishing	Bad weather conditions affecting own property
Most important coping mechanism	own money (83.97%)	own money (76.36%)	own money (76.23%)	own money (72.97%)
	borrow money (10.82%)	gift - village (11.82%)	borrow money (11.63%)	borrow money (16.02%)
	gift - village (1.20%)	borrow money (7.27%)	consume less (4.13%)	consume less (4.25%)
Second most important coping mechanism	borrow money (65.64%)	borrow money (53.85%)	borrow money (61.22%)	borrow money (57.42%)
	gift - village (9.03%)	gift - village (26.44%)	consume less (17.78%)	consume less (19.07%)
	consume less (6.83%)	gift - govt./NGO (8.17%)	gift - village (9.91%)	gift - village (9.53%)
Third most important coping mechanism	consume less (33.78%)	gift - village (38.76%)	consume less (52.42%)	consume less (49.20%)
	gift - village (20.48%)	gift - govt./NGO (15.73%)	gift - village (12.64%)	gift - village (15.51%)
	sell assets (10.11%)	sell assets (12.36%)	gift - govt./NGO (7.06%)	borrow money (10.70%)
n	499	220	387	518

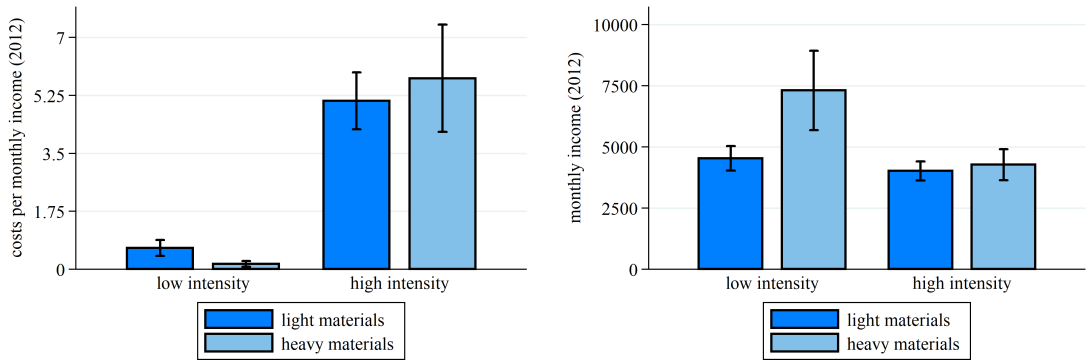


Figure 5.2: Damages caused by Yolanda to more or less stable households relative to monthly income across high and low intensity villages and monthly income

correlation between income and lighter materials, such as bamboo and thatch (nipa leaves). Therefore it seems likely that financially better endowed households tend to invest in more stable structures, which should in turn prevent damages through strong winds. However, this correlation is no longer prevalent if we only look at the sub-sample of high intensity villages. Therefore it seems like financially better endowed individuals are more engaging in stabler household materials if they stem from low intensity villages. This is still true if we only look at a sub-sample of individuals whose monthly household income was below the third quartile, therefore ignoring the rather rich and excluding the possibility that this observation comes purely from having more rich households in the southern region. Hence some other co-variates may explain the engagement in stabler structural components instead of income. If we compare individuals from households that embedded stable materials in their housing with the costs per monthly household income inflicted by Yolanda, we observe that more solid households had significantly less damages inflicted relative to their income if they were located in low intensity areas (0.16 vs. 0.64, p=0.029). However, this is not true for high intensity villages, as we can see in Figure 5.2. I test whether or not this observation holds in a multivariate probit regression with robust standard errors. We can observe that there is a significant interaction between income and living in low intensity areas (Table A2.4). However, both the effect sizes of income and the interaction of income and living in low intensity areas are almost negligible, since marginal effects after probit show that an increase in income in low intensity areas by one standard deviation results in a higher likelihood to build more stable houses by only 11.75 percentage points. Therefore, although it seems like richer individuals from low intensity villages invested significantly

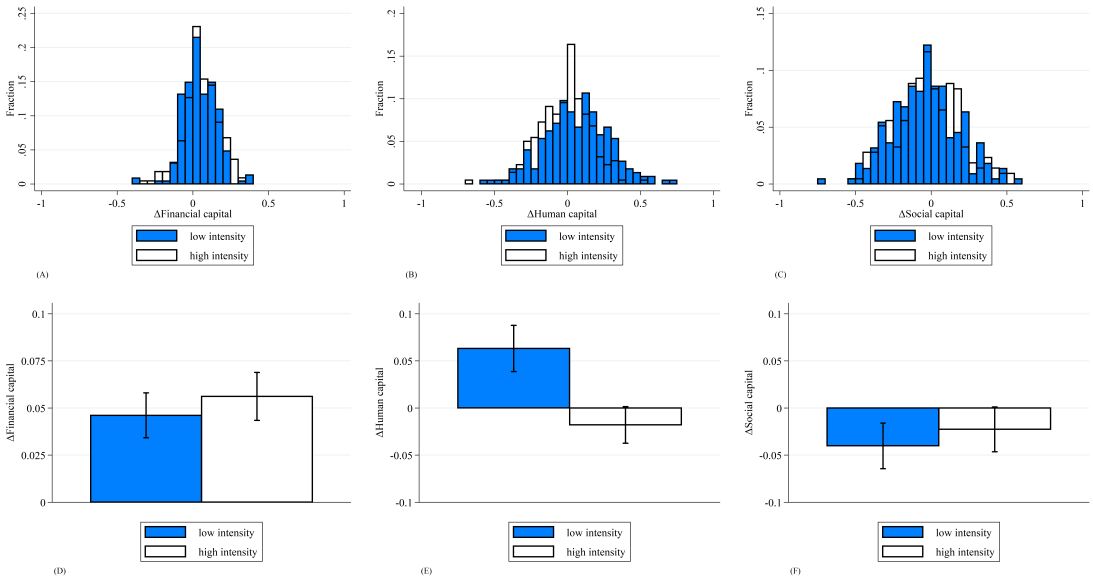


Figure 5.3: Changes in capital indicators by intensity (balanced part of the panel, n=449); parts (A) and (D): changes in financial capital ; parts (B) and (E): changes in human capital; parts (C) and (F): changes in social capital

more in more stable housing, this relation is relatively weak. But still, from Figure 5.2 we can see that more stable houses were more likely to result in less damages relative to household income as long as the shock is not too large for the houses to absorb the forces of nature. As a consequence, households from high intensity villages with more stable and cost intensive housing do not perform better in terms of relative losses to their income due to repairs caused by a strong tropical storm.

Table 5.18: Correlation between income and materials used to build houses before Yolanda

	income (2012)	thatch	bamboo	wood	cement	iron sheets	stone /bricks
income (2012)	1.000						
thatch	-0.118***	1.000					
bamboo	-0.193***	0.351***	1.000				
wood	-0.045	0.025	0.007	1.000			
cement	0.127***	-0.197***	-0.437***	-0.002	1.000		
iron sheets	0.064*	-0.320***	-0.152***	0.122***	0.339***	1.000	
stone/bricks	0.162***	-0.101***	-0.134***	-0.044	0.117***	0.096***	1.000

5.2 Effects of exposure on capital forms

In this section we will explore the relation between the development of different indicators for the five forms of capital over time and interpret the results in their respective context. Therefore we begin by looking at the development of the

chosen capital indicators (see section 4.4) over time and intensity level. We can observe from Figure 5.3 that the overall endowment with financial capital has slightly and significantly improved on average by about 0.05 points, which corresponds to an increase in financial capital by roughly half of a standard deviation over time (p=0.000). This increase was not substantially different between high and low intensity villages, and therefore at this point we could conclude that three years after Yolanda the financial situation has not only returned to normality in high intensity vilalges, but also improved slightly over time. Hence there seem to be channels at work which ensured that long term financial development converged towards a similar mean as in low intensity villages. We will support this claim later in chapter 6, where we compare our findings with results from the focus group discussions. Human capital, which consists in large parts of components which reflect psychological capacity of individuals, shows a heterogeneous development over time between high and low intensity villages. We can observe that while in low intensity villages the overall indicator for human capital has significantly increased by roughly a third of a standard deviation (p=0.000), the development in high intensity areas was negative and not significantly different from zero (p=0.121). Hence it seems like typhoon Yolanda has left some psychological scars in the minds of our participants even three years after the typhoon happened, which means that the impact of the typhoon might have also long term consequences on their behavior and overall functionality in the labor market. Parts (c) and (F) in Figure 5.3 show the development of the social capital index over time and intensity. We see that overall the development of social capital was negative and dropped from a score of 0.57 to 0.54 on average (p=0.003), which corresponds to a drop of roughly a fifth of a standard deviation in social capital. However, this decline in social capital does not substantially differ between high and low intensity villages, where the mean changes do not differ significantly from each other (-0.04 vs. -0.02, p=0.405). Hence it seems that overall, exposure to the typhoon did not influence the endowment of individuals with social capital. We will look at these relations in more detail when we look at the development of the single capital indicator components in the next few pages. For now, we continue by testing the relation between disaster exposure and the development of the capital indicators over time in a first difference and individual fixed effects regression.

Table 5.19 shows the results for a first difference regression of living in high intensity areas on the three capital indexes available. We use a dummy which indicates if the participant lives in a high intensity area and control for baseline

Table 5.19: Effect of intensity on changes in capital indicators

	(1) Δ Financial capital	(2) Δ Human capital	(3) Δ Social capital
High intensity	0.00	-0.02	0.01
	(0.01)	(0.01)	(0.02)
Baseline¶	-0.54***	-0.89***	-0.86***
	(0.06)	(0.05)	(0.05)
Constant	0.10***	0.69***	0.45***
	(0.01)	(0.04)	(0.03)
Observations	449	446	436
F	36.80	175.76	172.37
R^2	0.21	0.49	0.39
Adjusted R^2	0.21	0.49	0.38

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

¶ for simplicity, coefficients for baseline values were put into the same row.

values from 2012, to take regression to the mean effects into account (see Barnett et al., 2004) and cluster standard errors on the village level. The results from this regression suggest that that there is no significant difference in the development over time between high and low intensity villages for each capital indicator. A more conservative estimation that uses indidvidual fixed effects and clustered standard errors on the village level however concludes, same as we see in Figure 5.3, that there is a significant relation between the development of human capital over time and exposure to typhoon Yolanda. Table 5.20 shows the results for these regressions. As we can see from models (1) and (2), there seems to be no difference in the development of financial or social capital indicators over time accross different types of intensity. However, model (2) suggests that individuals from villages that are in high intensity areas score -0.08 points less in the human capital indicator than villagers from low intensity areas in 2016, which corresponds to an effect size of approximately half of a standard deviation in human capital. Hence we see hints that there is a connection between the development of human capital and natural disasters.

Figure 5.4 compares the means of the development of each selected capital indicator component over time between low intensity and high intensity areas. We can observe that the index for conscientiousness significantly increases in low intensity areas (+0.07, p=0.000), while it decreased in high intensity areas (-0.02, p=0.107). We can see from the graph that the development of being conscientious is rather asymmetrical between low and high intensity villages. The development of financial capital indicators shows that in general the financial situation of our

Table 5.20: Effect of intensity on capital indicators, fixed effects regression

	(1) Financial capital	(2) Human capital	(3) Social capital
Year (2016=1)	0.05***	0.09***	-0.04**
	(0.01)	(0.02)	(0.02)
(High intens.) X (year)	0.01	-0.09***	0.02
	(0.01)	(0.02)	(0.02)
Constant	0.10***	0.72***	0.57***
	(0.00)	(0.01)	(0.01)
Observations	898	895	885
F	37.03	9.67	4.03
R^2	0.17	0.09	0.02
Adjusted R^2	0.17	0.09	0.02

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

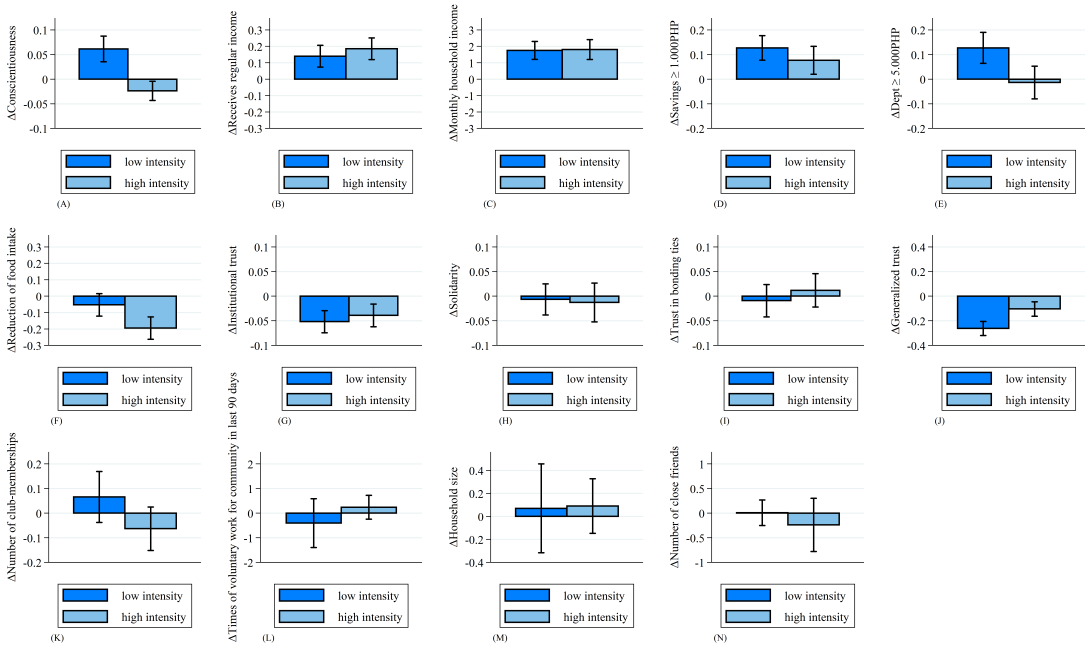


Figure 5.4: Changes in capital indicator components by intensity (balanced part of the panel, n=449); part (A): change in human capital indicators (conscientiousness); parts(B)-(F): change in financial capital indicators (regular income, monthly household income, savings, debt, and lack of financial endowment to ensure daily food intake); parts (G)-(N): change in social capital indicators (solidarity, trust in bonding ties, general trust, club memberships, voluntary community work, household size, and number of close friends)

participants improved over time. More people receive regular income, monthly incomes have increased, the share of individuals with savings above $1,000PHP$ has increased, and less individuals struggle to finance their daily food intake. From the graph we can see that this development differed between high and low intensity villages in two regards: Firstly, while the development of the share of individuals having dept higher than $5,000PHP$ is significantly positive in low intensity areas (+0.13, p=0.001), we do not see a clear development in high intensity areas (-0.01, p=0.737). Both means are significantly different from each other on the five percent level (p=0.011). Secondly, being able to provide daily food intake for the whole household decreased substantially less in low intensity villages than in high intensity villages (-0.05 vs. -0.19, p=0.015). However, the starting point of the share of individuals having to reduce meals due to a lack of liquid financial assets in low intensity villages was much lower in 2012, compared to high intensity villages (0.57 vs. 0.74, p=0.000). Trust in institutions has significantly declined by roughly a fourth to a third of a standard deviation over time (p=0.000), whereas the development did not substantially differ between low and high intensity areas (-0.05 vs. -0.04, p=0.514). The rest of social capital indicators show no striking developments, with the exception of generalized trust. We can observe that trust in general declined substantially over time, declining by about a half to two third of a standard deviation over time (p=0.000). This development seems to be not that dramatic in high intensity villages, where the share of individuals which stated that people can be trusted in general shrank by only -0.10, whereas in low intensity areas the share shrank by -0.26, which is more than double the value from high intensity areas (p=0.002). If we check whether we get the same results by looking at the unbalanced part of the panel, we get the very same picture overall (see Figure A1.3 in the Appendix). Hence we can see that there are indeed some potential effects of exposure to a natural disaster on certain aspects of human capital (conscientiousness), financial capital (debt and food intake), and aspects of social capital (generalized trust).

The next step is to check whether these relations between disaster exposure and capital hold in a multivariate regression. Table 5.21 shows the results for a first difference regression of living in high intensity areas on differences of capital indicators over time. Model (1) shows the result for being conscientious (an indicator that represents part of human capital), models (2)-(6) show the results for financial capital indicators (regular income, household income, savings, debt, and lack of funds for regular food consumption)), and models (7)-(14) show the results for social capital indicators (institutional trust, solidarity, trust in bonding

Table 5.21: Effect of intensity on changes in capital indicator components

	(1) Δ Conscientiousness	(2) Δ Receives regular income	(3) Δ Household income	(4) Δ Savings $\geq 1,000 PHP$	(5) Δ Debt $\geq 5,000 PHP$	(6) Δ Reduction of food intake	(7) Δ Institutional trust	(8) Δ Solidarity	(9) Δ Trust in bonding ties	(10) Δ Generalized trust	(11) Δ Number of club-memberships	(12) Δ Voluntary work	(13) Δ Household size	(14) Δ Number of friends
High intensity	-0.01	-0.03	-0.21	0.00	-0.10**	-0.01	0.00	-0.05	0.02	0.09**	-0.10	-0.40	-0.09	0.10
	(0.01)	(0.05)	(0.54)	(0.04)	(0.05)	(0.05)	(0.02)	(0.03)	(0.02)	(0.03)	(0.09)	(0.50)	(0.30)	(0.13)
Baseline[¶]	-0.93***	-0.85***	-0.44**	-0.63***	-0.74***	-0.81***	-0.91***	-0.86***	-0.82***	-0.92***	-0.75***	-1.00***	-0.35***	-1.01***
	(0.03)	(0.07)	(0.19)	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.03)	(0.06)	(0.04)	(0.06)	(0.02)
Constant	0.77***	0.37***	3.58***	0.21***	0.36***	0.41***	0.53***	0.41***	0.48***	0.04**	0.43***	2.51***	1.88***	2.64***
	(0.03)	(0.05)	(0.77)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.02)	(0.07)	(0.51)	(0.42)	(0.13)
Observations	446	449	449	449	449	449	439	448	443	446	449	449	449	442
F	356.19	66.79	2.70	74.04	81.22	158.69	121.02	74.26	96.23	396.18	84.22	291.24	18.35	1620.08
R^2	0.52	0.35	0.09	0.24	0.37	0.38	0.43	0.37	0.33	0.65	0.36	0.41	0.05	0.86
Adjusted R^2	0.51	0.35	0.09	0.23	0.36	0.38	0.42	0.37	0.33	0.65	0.36	0.41	0.04	0.86

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

¶ for simplicity, coefficients for baseline values were put into the same row.

ties, general trust, number of club memberships, voluntary work, household size, and number of close friends). As we can see, only the coefficients in model (5) and (10) show a significant impact of disaster exposure on the development of the dependent variable. More specifically we see that debt did not increase as much as in low intensity areas and the difference in development of the variable is a bit more than a fifth of a standard deviation in the share of individuals being indebted above $5,000PHP$ in 2012, and between a fifth and a sixth of a standard deviation in development over time. The other variable which is significantly explained by disaster exposure generalized trust (model(10)), while other changes in aspects of social capital cannot be explained by being exposed. While trust in general severely declined over time, the model predicts that it does less in high intensity areas by about a fourth to a third of a standard deviation of the share of individuals who trust others in general from 2012, and about a fifth to a sixth of a standard deviation in the development of trust. A more conservative individual fixed effects regression (Table 5.20 in the Appendix) confirms the direction of these relations and additionally we see that also the reduction of meals due to a lack of meals has declined about a fourth of a standard deviation more in high intensity villages than in low intensity villages.

Therefore we provide evidence that natural disasters do alter first of all human capital, and second of all that especially being conscientious seems to decline due to a disaster, which could point towards psychological pressure still being present three years after the disaster. This indicates that disasters have long term consequences on the functioning of human beings in their everyday life, since they influence the fundamentals of our personality. Additionally we see that debt has declined more in high intensity villages, which means that there could have been some channels at work which helped high intensity villagers to relief some financial pressure from them. We have heard anecdotes about villagers living in high intensity areas whose debts have been canceled due to the typhoon, such that their fundamental livelihood is not harmed for long term periods. This observation is inline with the result that the share of individuals who had to reduce meals due to a lack of financial funds declined more in high intensity villages, which shows that probably the social safety nets at place and governmental and non-governmental institutions succeeded in targeting low income families with regard to disaster relief. Furthermore we observe that trust declines in general, but did less so in high intensity villages. This finding could be a result of putting individuals that suffer from the same kind of problem in the same boat and therefore increasing bonding elements. Individuals from high intensity villages

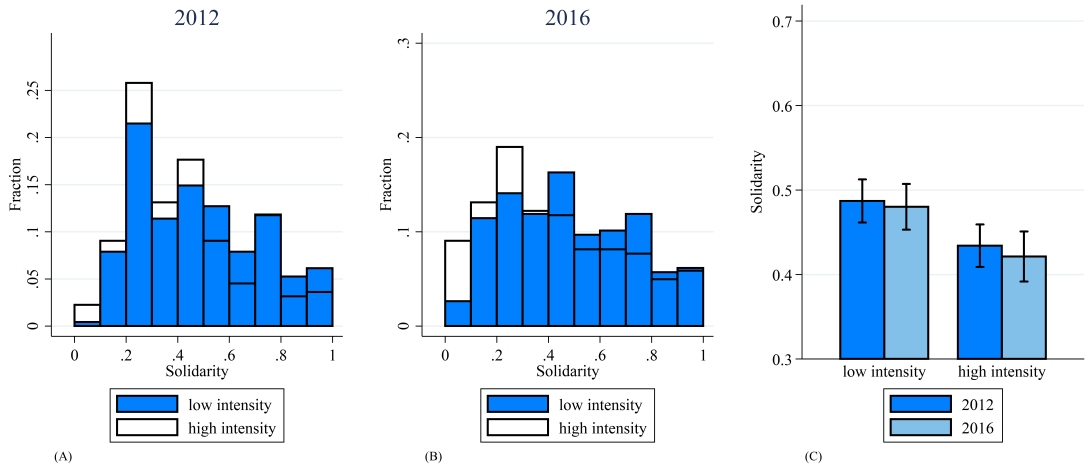


Figure 5.5: Changes in solidarity over time and intensity (balanced part of the panel, n=449); part (A): distribution of solidarity index in 2012; part(B): distribution of solidarity index in 2016; part (C): mean solidarity over time and intensity

did also not only suffer damages - they experienced help from outside actors and internal actors such that they probably formed reciprocal ties not only with each other, but also with individuals from other levels of the social hierarchy. This suspicion is connected to the observation that the perception of external help was almost double as high, and the help from friends and neighbors was also a little bit higher in high intensity villages. Therefore one side effect of disaster relief aid could be that social cohesion is fostered simply by the act of helping others in times of need, even if the help comes from outside actors. However, we have to admit at this point that the positive influences on trust were not able to completely dampen the negative development of trust over time, but nevertheless significantly helped to keep trust levels a bit higher thatn without those channels that resulted from the disaster.

5.2.1 Effects of exposure on experimentally measured solidarity and risk preferences

This subsection explores the relation between the exposure to the typhoon and changes in the behavior of our participants in experimental solidarity game and risk tasks. Experimentally measured outcomes are generally seen as "better practice" in science than survey measures, since their reliability is acknowledged to be more prevalent. Therefore we will look at them a bit in more detail in this subsection We begin by looking at how the behavior of our participants in experimental games alters over time and intensity levels.
Figure5.5 shows the distribution of the solidarity index for both years, as well

as mean outcomes for each year and level of intensity. From Figure 5.5 we can see that solidarity neither developed substantially over time, nor did it develop substantially different between high and low intensity villages. While the average solidarity score in 2012 was 0.46 in 2012, it almost stayed constant over time and only decreased slightly to 0.45 in 2016. If we test for equality of distributions in each year using a Kolmogorov-Smirnov test, we observe that that the null of unequal distributions cannot be rejected (p=0.036 in 2012, p=0.005 in 2016). A two sided T-test also rejects the hypothesis that there are no substantial differences in means of solidarity between high and low intensity villages (p=0.015 in 2012, p=0.016 in 2016). High intensity villages tend to have lower scores in solidarity in both years (0.49 vs. 0.43 in 2012, 0.48 vs. 0.42 in 2016). However, if look at the development of solidarity with respect to level of intensity, we can observe that changes in solidarity between high and low intensity villages do not substantially differ (see also Figure A1.4). This observation is also mostly true if we look at each component of the solidarity index separately, with the exception of transfers to anonymous players in the first solidarity game. These transfers significantly declined over time from an average from 30.42PHP to 25.98PHP (p=0.000), which corresponds to a decline of roughly a fourth of a standard deviation in transfers to anonymous players. Nevertheless we do not observe significant declines of transfers over time in transfers to known group members in the first solidarity game, and transfers to anonymous and non-anonymous players in the second solidarity game (see Figures A1.5, A1.6, A1.7, and A1.8). Transfers to non-anonymous players in the first game stayed rather constant at about 33.00PHP over time (32.95PHP in 2012, 33.84PHP in 2016, p=0.401), as well as transfers to anonymous players (32.27PHP in 2012, 32.83PHP in 2016, p=0.586) and non-anonymous players(35.40PHP in 2012, 34.51PHP in 2016, p=0.391) in the second solidarity game. Since neither the solidarity index nor its respective components show consistent and significant changes over time, we can overall conclude that solidarity in general seems to have stayed rather constant over time. In a further step we look at the differences between transfers to known group members and anonymous group members (Figures A1.9 and A1.10). On average, participants consistently and significantly gave between $2PHP - 8PHP$ more to their known group members on average than to anonymous players in the solidarity game (p-values ≤ 0.002), which corresponds to a difference of about a tenth to two fifth of a standard deviation of transfers in the solidarity game (standard deviations were between 19.80 and 22.37). The development of the difference between transfers to anonymous and non-anonymous players shows inconsistencies between

the first and second solidarity game over time, since we observe a significant increase in the difference in the first game (from 2.53PHP to 7.86, p=0.000) and a significant decrease in the second game (from 3.13PHP to 1.68PHP, p=0.036). Therefore I cannot reach a conclusion regarding the development of in-group behavior of participants, since it does not seem to be consistent across the two different specifications of the solidarity game. Now we take a look at the relation between changes solidarity transfers in the experimental games over time and living in high intensity areas using regression models. Table 5.22 shows the results of a simple OLS regression on changes in solidarity indicators, using clustered standard errors on the village level. Models (2)-(4) show the results using observations from the first solidarity game and models (5)-(7) use observations from the second solidarity game which was the same in nature, but followed by conditional choice list after the transfer decision (for details see section 3.3.1 or the protocols from 2012 and 2016 in the Appendix). Model (1) simply uses the previously constructed solidarity index as a dependent variable. We see from model (1)-(7) that overall neither changes in the solidarity index or its components, nor the resulting measure for in-group bias are significantly explained by living in high intensity areas. If we include standard control variables into each model, we obtain similar results (see Table A2.42 on page XXXVIII in the Appendix). Additionally, a more conservative estimation using panel regression with individual fixed effects shows no significant effects of exposure on individual transfer decisions and the solidarity index, neither by using the balanced nor-unbalanced panel data set (see tables A2.43 and A2.44 in the Appendix).

Table 5.22: Effect of intensity on changes in solidarity and in-group behavior

	(1) Δsolidarity	(2) Δtransfer anonymous (1)	(3) Δtransfer friend (1)	(4) Δingroup bias (1)	(5) Δtransfer anonymous (2)	(6) Δtransfer friend (2)	(7) Δingroup bias (2)
High intensity	-0.05	-3.10	-3.08	0.14	-3.93	-4.19	-0.47
	(0.03)	(2.27)	(2.60)	(1.54)	(2.56)	(2.62)	(1.56)
Baseline¶	-0.86***	-0.87***	-0.90***	-0.89***	-0.90***	-0.85***	-0.99***
	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)
Constant	0.41***	22.75***	32.01***	8.24***	30.95***	31.25***	2.49**
	(0.03)	(2.37)	(2.08)	(1.12)	(2.38)	(2.86)	(1.11)
Observations	448	449	449	449	448	448	448
F	74.26	122.24	130.72	109.99	117.24	73.66	141.18
R^2	0.37	0.43	0.37	0.40	0.41	0.36	0.34
Adjusted R^2	0.37	0.42	0.37	0.39	0.41	0.36	0.34

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

¶ for simplicity, coefficients for baseline values were put into the same row.

Now we take a look at the second solidarity game, which was a repetition of the first one, but included a list that asked about conditional transfers, meaning that

we asked a battery of question like: "If player X transfers Y PHP to you if you lose, how much would you transfer in case this player loses instead?". Therefore we can check how important conditionality is for each individual with regard to the solidarity game and say more about fairness concerns. We use the results of this second solidarity game to classify individuals into "egoists", "altruists", "conditional cooperators", and "other types" similar to citetFischbacher2001. As a reminder, possible transfers were between $0-70PHP$ in steps of 10, with all possible conditional transfer combinations between those. The condition for someone falling into the category of counting as a conditional cooperator is either if the individual decides to place transfers exactly on the 45 degree line, or the correlation coefficient between the transfer of the individual and the 45 degree line is at least 0.84 and the maximum and minimum conditional transfer do not have a difference larger than 30. Someone would be considered egoistic, if the transfers on the sheet would always be below 20, and altruistic if transfers would be always above 50. Hence the remaining individuals that could not be categorize into these types of cooperators would fall into the "other type" category. The share of egoists dropped from 23.39% to 18.04% between 2012 and 2016 (p=0.048), similar to the share of altruists (24.94% vs. 19.60%, p=0.054). The share of conditional cooperators in the second solidarity game increased from 43.65% to 50.33% (p=0.044). Overall, consistency in the types of conditionality is rather low, since merely 36% of individuals from the balanced panel are classified into the same category in both years. Figure 5.6 visualizes the inconsistencies over time by plotting the sum of all conditionality types for all consistent[4] participants. As we can see, distributions of types look fairly similar each year on average and indeed, a Kolmogorov-Smirnov test for equality of distributions never rejects the null, and hence we could conclude that preferences were rather stable over time. However, from Figure 5.6 we can clearly see that this is not the case and stability of each type within individuals tends to be below 50%. The question which remains is if these types of inconsistencies are also linked to disaster exposure. Therefore I test if changes in preference types can be explained by living in high intensity areas in a individual fixed effects regression using the balanced part of the panel data set. Table 5.23 shows the results of individual fixed effects panel regression of a year dummy and an interaction of the year dummy with a dummy which indicates if individuals live in high intensity villages. The results indicate that over time, there was no significant development in low intensity areas, with the exception of

[4]By "consistent" I mean in this case participants, which had the same kind of seat assigned in the experiments, meaning that they had the same role in both years either playing as an anonymous, or non-anonymous player.

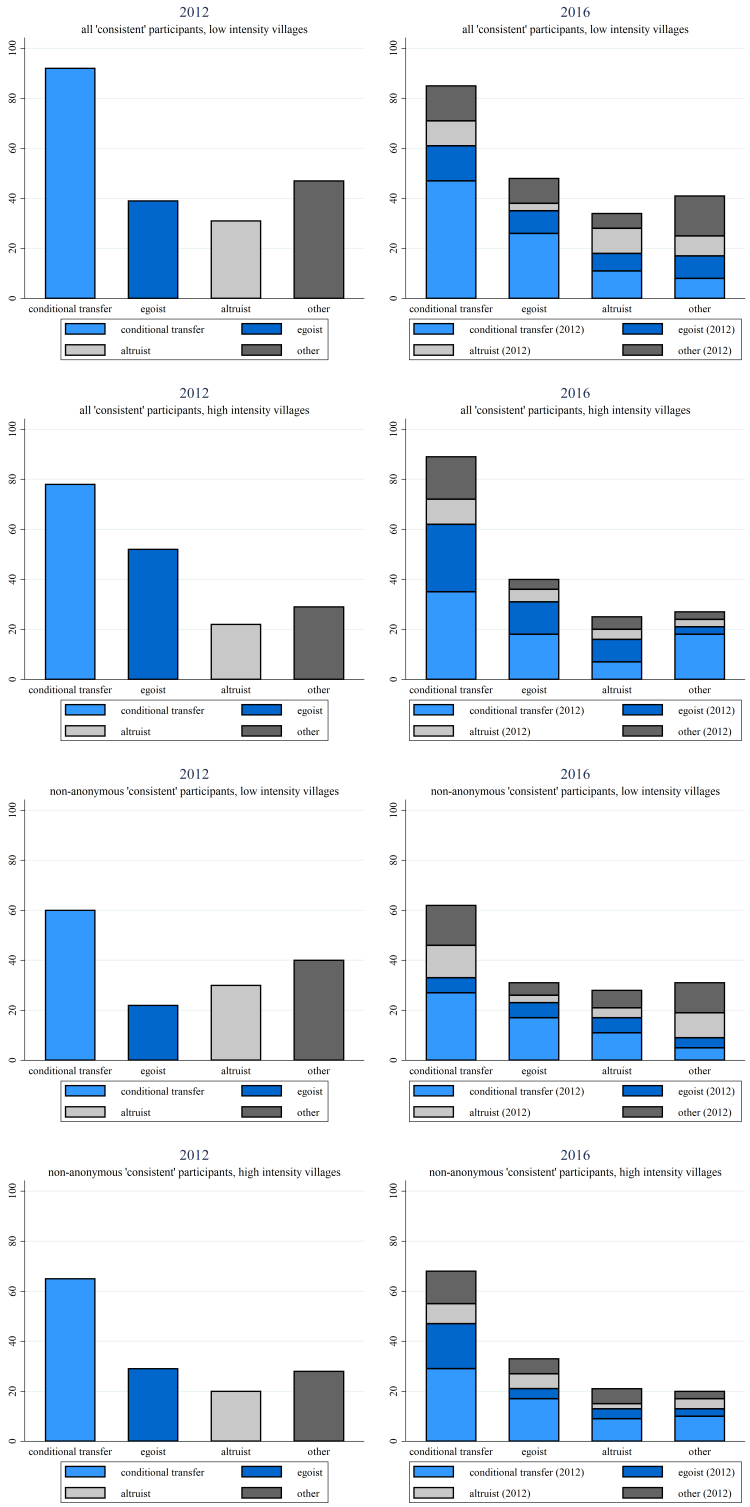


Figure 5.6: Changes in preference types

other types, which increased in low intensity areas over time. We can observe that high intensity areas had a significantly lower increase in the share of individuals that fell into the other types by about −0.08. However, the number of inconsistent participants was not significantly higher in high intensity villages compared to low intensity villagers. This relation can also be shown graphically by Figure 5.7, where we can observe that the overall significant changes over time which we find in the whole balanced data set do not occur when we look at the subsamples of low and high intensity villagers, where there are almost no significant developments, with the exception of other types (as can be seen in the regression above) and the share of conditional cooperators, which significantly increased in high intensity villages from 44.34% to 56.11% (p=0.013). Although this could be a sign that in high intensity villages reciprocal ties have strengthened over time, this does not necessarily mean that this change can be attributed to the events that followed the typhoon, since this difference is not significantly different from the development in low intensity areas.

Table 5.23: Effect of intensity on changes in conditionality types, fixed effects regression

	(1) Egoist	(2) Altrusit	(3) Conditional cooperator	(4) Other type	(5) Consistent in both years
year (2016=1)	-0.04	-0.05	0.02	0.10***	0.35***
	(0.03)	(0.04)	(0.05)	(0.03)	(0.04)
high intens. X year(2016=1)	-0.03	-0.00	0.10	-0.08**	0.03
	(0.06)	(0.06)	(0.07)	(0.04)	(0.05)
Constant	0.23***	0.25***	0.44***	0.02**	0.00
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Observations	898	898	898	898	898
F	1.89	1.44	2.40	5.41	156.98
R^2	0.01	0.01	0.01	0.06	0.36
Adjusted R^2	0.01	0.01	0.01	0.05	0.36

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

To summarize this section, we do not observe substantial relations between disaster exposure and changes in-group or outgroup solidarity transfers, as well as development of in-group bias or changes in conditionality transfers over time. Therefore I conclude that solidarity as the underlying concept behind the solidarity game is not influenced by disaster exposure and hence we can partly reject H6a, which stated that social capital declines due to disaster exposure. rather we see some results that point into the opposite direction: generalized trust has declined less in high intensity areas, and therefore it seems like bonding between villagers was taking place due to the disaster, which put everyone into the same boat, sometimes maybe literally.

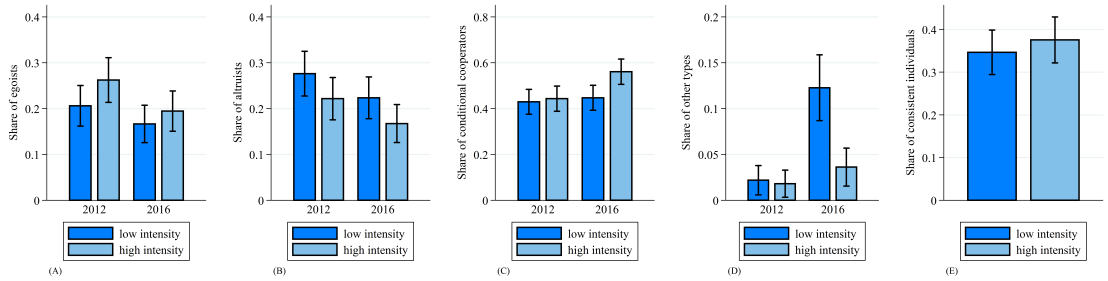


Figure 5.7: Changes in preference types over time and intensity; part (A): development of the share of egoists; part (B): development of the share of altruists; part (C): development of the share of conditional cooperators; part (D): development of the share of other types; part (E): share of consistent participants which fell into the same category in 2012 and 2016

Risk-preferences

This sub-section is dedicated to shed some light on the the relation between disaster exposure and risk-preferences of exposed individuals. As stated in sub-section 2.4.2, many scholars have sought to understand more about the impact of disaster exposure on risk preferences in the long term. Many studies show a probable long term relation between disaster exposure and increases in risk aversion (cf. Eckel et al., 2009; Van Den Berg et al., 2009; Page et al., 2012; Cameron and Shah, 2015; Samphantharak and Chantarat, 2015; Kahsay and Osberghaus, 2016; Cassar et al., 2017). We look at this question by comparing outcomes from the risk experiments in each year and acheck whether or not our results hold if we use survey measured items instead of experimentally, financially incentives ones. We begin by looking at the outcomes of the first game in each year, the risk task, which was a binary choice in 2012 between a a fifty-fifty chance of winning $200PHP$ or nothing versus a fifty-fifty chance of winning$160PHP$ and 40. Hence we categorize people to be rather risk averse if they choose the second option. To make the outcomes of both risk games comparable to each other we first elicit the risk premium for all individuals per lottery that was played in 2016 and categorize individuals into being rather risk averse if the average risk premium for all three lotteries is larger or equal than zero. Therefore we can now compare the share of relatively risk averse individuals from 2012 with the share in 2016 and see, if the development over time is related to typhoon exposure. This procedure of course has a mentionable caveat, namely that we cannot really interpret absolute variable values, since both measures are very different between both years. However, we should still be able to derive treatment effects for being exposed, since the experimental nature of the study is designed to exclude that other than treatment effects should be responsible for significant

differences in development over time. Additionally we use the information we collected from surveys where we asked participants how willing they are in general to take risks. We also used different scales in both years (a five point Likert scale in 2012 and a scale from 0-10 in 2016) and therefore rescale the values for both variables between zero and one for each year and compare their development over time. The results of this comparison can be found in Figure 5.8. We observe that the share of relatively risk averse individuals has declined over time from 0.45 to 0.36 (p=0.009), whereas this development does not seem to be substantially different between both high intensity and low intensity areas. We observe that the development was significantly negative in low intensity areas (p=0.014), whereas it did not significantly decline in the sub-sample of high intensity villagers (p=0.214). The results for survey measured risk aversion point in another direction, which I suspect is the result of experimentally measured values not representing the "true" development over time. In general individuals perceived themselves as more risk averse in 2016 compared to 2012 (0.47 vs. 0.33, p=0.000), whereas this development seems to be true for both types of villages, since risk aversion seems to have increased in low intensity areas by roughly 0.15 (about half of a standard deviation, p=0.000) and increased in high intensity areas by 0.13 (also about half of a standard deviation, p=0.000). Again, we check whether or not developments over time were distorted by the exposure to the typhoon. Therefore we check whether differences in the share of risk averse individuals or average survey measured risk aversion can be explained by disaster exposure in a individual fixed effects panel regression. Let me state again that I will refrain from interpreting absolute values of his analysis and merely focus on testing whether or not significant differences in the development of risk aversion can be attributed to living in high intensity areas, and therefore to the typhoon. The results of this regression can be found in Table 5.24. The results suggest that there is no significant relation between being affected by the typhoon and developments of risk aversion, neither if we test for the development of experimentally risk aversion nor survey measured risk aversion. We get the same results if we repeat the same test with the unbalanced part of the panel (see Table A2.45 in the Appendix). Hence we can conclude that there seems to be no long term changes of risk preferences that were caused by typhoon Yolanda, and we can reject the respective hypothesis (H8a).

Changes in optimism

Now I want to take a short look at how experiencing a natural disaster affects the way individuals perceive future opportunities in general, and hence how their

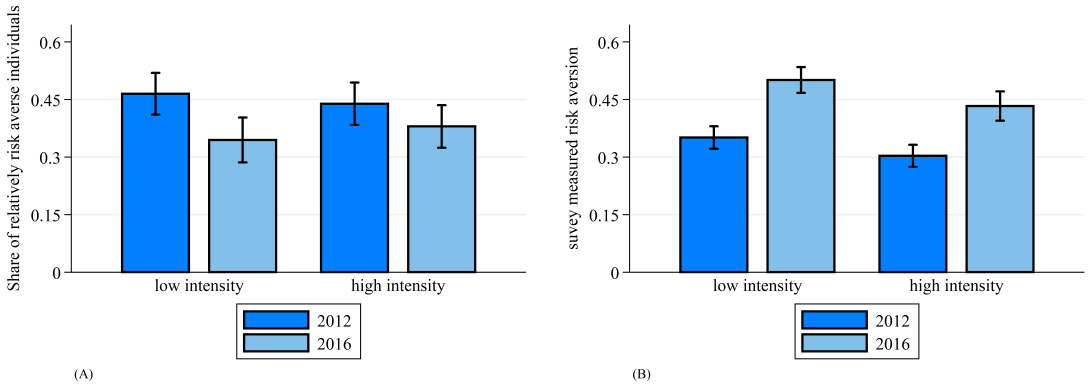


Figure 5.8: Changes in the share of relatively risk averse individuals across time and intensity, balanced panel (n=449); part (A): differences in the development of experimentally measured risk aversion with monetary incentives; part (B): differences in the development of survey measured risk aversion

Table 5.24: Effect of intensity on risk aversion, fixed effects regression

	(1) risk aversion - incentivized	(2) risk aversion - survey measured
year (2016=1)	-0.08	0.15***
	(0.06)	(0.03)
high intens. X year(2016=1)	0.04	-0.02
	(0.08)	(0.04)
Constant	0.44***	0.33***
	(0.02)	(0.01)
Observations	837	895
F	1.41	24.35
R^2	0.01	0.11
Adjusted R^2	0.01	0.11

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

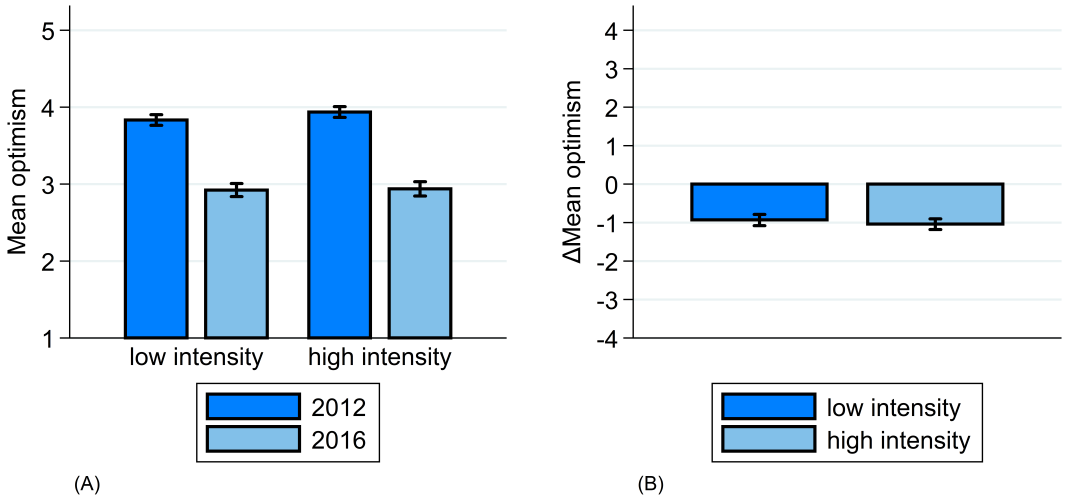


Figure 5.9: Changes in survey measured optimism; part (A): differences across years and intensity (unbalanced panel; N=1156); part (B): differences in the development of optimism (balanced panel, N=449)

optimism changes.

First, let us take a look at Figure 5.9, which shows the development of mean answers regarding general optimism. Participants were asked by us to rank on a scale of one to five how optimistic they feel regarding the future, where one meant "not optimistic at all", and five meant "completely optimistic". The mean values of survey measured optimism differ substantially between years. For example, if we look at the unbalanced panel (N=1156), we can see that the mean of optimism is in 2012 was 3.88, whereas it dropped to 2.93 in 2016 (p=0.000) We see the same kind of development if we strictly look at the balanced part of the panel (N=449), where the mean level of optimism significantly drops on average by about -0.99 scale points (p=0.000). However, the figures imply that the development of answers regarding optimism is not related to typhoon exposure, since there are no visible differences between the development of optimism, neither in the balanced, nor the unbalanced panel. further check if I can see some significant explanatory power of being exposed to the typhoon on optimism. Thereby I explore the relation between the answers of survey participants regarding optimism and exposure to Yolanda the same way I did before using FD and FE regression. The results of these regressions can be found in Table 5.9, which basically confirms what we optically see in the graphs, namely that there seems to be no relation between changes in optimism and exposure to the typhoon.

Table 5.25: Effect of intensity on changes in optmism

	(1) FE - unbalanced	(2) FE - balanced	(3) FD
Year (2016=1)	-0.93***	-0.93***	
	(0.11)	(0.11)	
(year)*(high intensity)	-0.11	-0.11	
	(0.12)	(0.12)	
High intensity			-0.01
			(0.09)
Baseline optimism			-0.82***
			(0.06)
Constant	3.90***	3.88***	2.19***
	(0.03)	(0.03)	(0.24)
Observations	1601	895	446
F	264.58	264.32	95.33
R^2	0.37	0.37	0.31
Adjusted R^2	0.37	0.37	0.30

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

¶ for simplicity, coefficients for baseline values were put into the same row.

6. Discussion and Conclusion

In this chapter I discuss the results in the context of related literature and will try to check the robustness of results. Furthermore I discuss potential sources of bias and give respective interpretations that follow from that investigation. I begin by discussing the results by comparing them to the findings from similar studies which I have mentioned in chapter 2 and continue by exploring potential bias that could arise from self selection, attrition and migration in subsection 6.0.1. We are also going to explore potential learning effects that could influence the behavior of our participants in subsection 6.0.2.

We found evidence of declining conscientiousness as a result of typhoon exposure, which indicates that individuals suffer long term setbacks in the development of their mental capacities. This result is inline with the findings from the meta study of Baez et al. (2010), which shows that studies uniformly report declines in mental health of study participants. We also observe this relation, but more with regard to a mental capacity, and not mental health in general. However, we do not find that individuals endowed with better education are better prepared for disaster as the study by Muttarak and Pothisiri (2013) states and additionally we were not able to conclude that formal education was a promising channel to reduce the time or costs of disaster recovery and hence find contradicting results to Frankenberg et al. (2013). However, we saw that especially high school and college graduates perceived higher levels of external help by governmental and non-governmental institutions. Hence it seems plausible to assume that higher

educated individuals were better at communicating with individuals in charge of disaster relief efforts and therefore had comparative advantages to receive disaster relief goods.

Regarding social capital, I also find an overall positive effect on perceived external help, but was unable to explicitly link this relation to bridging social capital since we did not observe a positive relation between trust in governmental and non-governmental institutions and perceived help by those institutions. Additionally I do not see an overall negative relation between recovery time and social capital in general as Nakagawa and Shaw (2004), but see that network sizes were able to alleviate some of the recovery time of individuals, which indicates that individuals with larger networks tend to be faster in disaster recovery, which could be a result of the ability of individuals to help each other out after disaster. However, this relation seems to come with a minor caveat: We observed that individuals with larger networks tended to perceive less help from friends and neighbors that individuals with smaller networks. Therefore it could be that individuals with larger networks, although they clearly performed better than individuals with smaller networks, tend to underestimate the strength of their networks capacity to help them, especially when members of their network have to take care of their own needs as well. Therefore I conclude that not necessarily social capital in general increases disaster resilience (we even observe that individuals endowed with higher social capital perceive themselves as more affected than others), but rather that investments in network building would be effective to lower recovery time after a disaster. Hence social capital seems to be a potential driver to increase access to external help, but in general the most relevant channel to decrease recovery times seems to be network size (with almost equal effect size as financial capital). Hence efforts to increase inclusiveness and community participation might be promising to network individuals and households with each other and hence drive effects of risk sharing. One channel which therefore may greatly contribute to the resilience of communities is inclusion of the general public in disaster mitigation planning in regular meetings, which has been identified as a promising channel before(Berke et al., 1993; Pearce, 2003).

The most robust finding we can present from the data in the Philippines is that overall, especially financial capital ensured quicker disaster recovery time and is also related to higher perception of internal help by friends and neighbors. Especially individuals who lacked financial funds to ensure daily food consumption for every member of the household needed longer to repair their households, which indicates that they found it harder to allocate their efforts towards disaster

recovery while still struggling to be able to provide basic needs for their family members. Therefore Disasters could end up being poverty traps as discussed by Carter et al. (2007) and (Morduch, 1994). I find no robust relation between having access to financial funds and better reaction times and hence conclude that differences in financial capital endowment do not necessarily lead to better access to warning systems as previously presumed (c.f. Mark and Semaan, 2008; Mark et al., 2009). Additionally we saw that households rather invested in heavy materials for constructing their houses if they were in low intensity areas, and especially these households suffered lower costs compared to their monthly income than households which did not invest in heavy materials. Also, looking at clusters endowed with different forms of capital revealed that especially the cluster endowed with relatively high financial capital performed best with regard to recovery time. Altogether the financial capital index and its components had highest explanatory power of recovery time, and therefore it seems like investments in institutions which ensure access to financial assets seem most promising to reduce the time households need to recover. Hence we believe that better access to micro insurance could be a potential channel which improves adaptive capacities of households, especially for the poor (Clarke and Grenham, 2013).

Physical capital indicators poorly explain resilience indicators, with the exception of households having imbedded heavy materials in their structure, which was negatively correlated with perceived external help. Hence it seems like some sort of targeting by disaster relief efforts was taking place and that especially households which previously only used light materials were favored by external relief efforts.

When we look at the question, how capital endowment of individuals changed due to the typhoon and how behavior was affected respectively, we found that almost none of our capital indicators and behavioral measures seem to be significantly explained by typhoon exposure, with the exception of conscientiousness and generalized trust. We found no evidence for individuals updating their risk preferences in contrast to a manifold body in the literature (cf. Eckel et al., 2009; Van Den Berg et al., 2009; Page et al., 2012; Cameron and Shah, 2015; Samphantharak and Chantarat, 2015; Kahsay and Osberghaus, 2016; Cassar et al., 2017), no impact of disaster exposure on solidarity, also in contrast to other studies which investigate the connection between disasters and social preferences (cf. Whitt and Wilson, 2007; Castillo and Carter, 2011; Fleming et al., 2011; Li et al., 2013; Becchetti et al., 2017), and also mostly no long term impact of typhoon exposure on overall financial and social capital. Therefore, although many studies find

long term impacts of disaster exposure on risk or social preferences using cross sectional studies, we do not reach the same conclusion with our longitudinal design. However, the external validity of results is in question when we look at the special cultural context in which we operate. The Philippines have a well known tradition which represents a long term adaption to typhoons which is in local language called "bayanihan" and "damayan" as expressions of "pakikipagkapwa"[1] (Barameda and Barameda, 2011), which represent expressions that are traditionally held high in the Philippines during times of crisis. These social norms make sure that Filipinos tend to help wherever they can in times of need, such that victims of disaster are usually able to count on their friends, family and neighbors in times of need. However, since *pakikipagkapwa* is known to be present in times of need, conversely it declines after times of need are over. Hence it may be that especially in times of need solidarity occurs, while they return to normal levels when things have returned to normality. From the time-lines which the participants from focus group discussions drew we can see that this assumption indeed seems to be somewhat true. Figure 6.1 represents the results of the time-line and shows the average development of solidarity and average income over time since shortly before Yolanda occurred (the line starts in October 2013). According to the focus group discussion participants, income dropped substantially right after Yolanda, whereas it seemed to return to previous levels quite quickly in low intensity villages (after about 2-3 months after the disaster), while high intensity villages needed substantially longer to return to pre-Yolanda levels (about eleven months). Both high and low intensity villages show the same pattern regarding the seasonality of income, which indicates that the time-line itself worked quite well and individuals engaged in meaningful participation during the discussion. If we look at the development of average solidarity in the villages, we can observe that in the month when Yolanda was happening solidarity peaked highly, but also quickly returned to normal levels. Hence we see that even the participants themselves do not believe that their solidarity and respective social norms have changed due to or after Yolanda. We also see that solidarity was higher in high intensity villages compared to low intensity villages on average. This shows that the effects on solidarity which we do not find in our multivariate regressions could be explained by the well adapted culture of *bayanihan* and *damayan* which lead to short term increases in solidarity, but also do not let developments in solidarity happen over time, even after such a strong typhoon such as Yolanda.

[1] The terms can be broadly translated to "heroic assistance", "solidarity" and "humanism" (Barameda and Barameda, 2011).

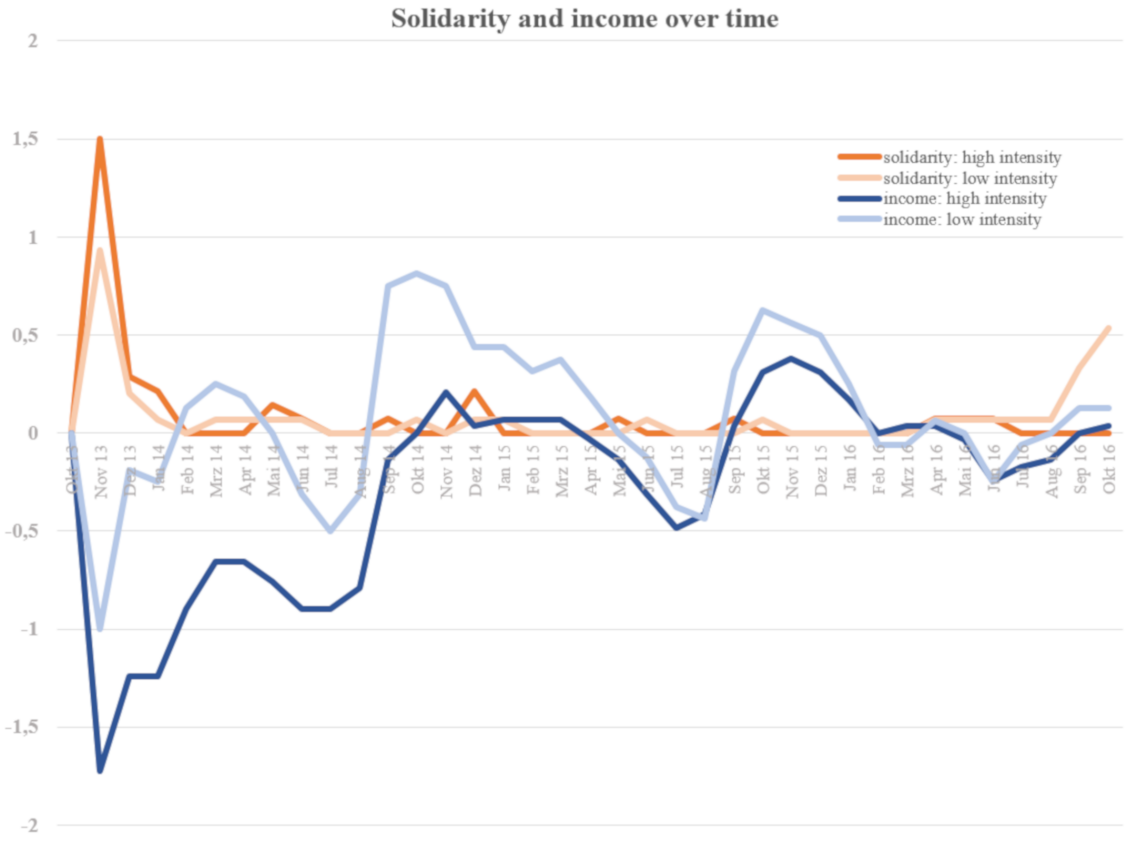


Figure 6.1: Mean development of solidarity and income over time between high and low intensity villages, results from the focus group discussions

Now that I have provided an overview of the results I continue by exploring the potential for bias in the results which I find (or do not find) in the scope of this study.

6.0.1 Attrition, self-selection and migration

In this section I discuss if the results we find could be biased by attrition (c.f. Hausman and Wise, 1979), self selection (c.f. Heckman, 1979, 1990a,b) or migration. I begin by looking at differences in key characteristics of returnees and non-returnees of this study and try to explore if there are certain characteristics which determined if an individual returned to our workshops in 2016 or not. Next we will take a look at exposure variables and see, if they can be explained by some of the key-characteristics and variables of interest in this study. Hence I want to test whether self selection was occurring due to concerns that there are differences in characteristics between high intensity area residence and low intensity area residents. Following a short discussion on migration after the typhoon, I will check if there is a connection between answering behavior in the second wave of observation and remembering the workshop from 2012. Table 6.1 shows mean summary statistics of key characteristics of returnees and non-returnees from low intensity and high intensity villages and respective mean comparison tests which indicate if returnees and non-returnees differed significantly in some of their characteristics. We observe that the key variables of interest, such as financial capital, human capital, and social capital, do not differ significantly between returnees and non-returnees and therefore we can assume that attrition bias plays an almost non existent role in this study. However, if we look at age, gender and the absolute number of years a person lives in its respective village, we find that rather women returned to our workshop in 2016, which seems to be true for both high intensity and low intensity villages. Additionally we observe that rather elderly individuals and individuals which live longer in a village return to our workshops if they stem from low intensity areas. In high intensity areas we observe a higher likelihood of individuals returning if they were lacking financial funds for food consumption in 2012. If we look a bit closer into the connection between key characteristics and returning to our workshop in 2016 in a regression (Table 6.2) we can observe that indeed living longer in a village seems to be able to explain returning to our workshop, although the effect size is rather small since an increase in living in a village by one year is associated with increases in the likelihood to return by below one percent. However, we also can see that being female has quite a substantial impact on returning to the workshop, where females

were about 21% likelier to return to our workshop if they were from high intensity villages. Therefore it could be that females are a bit overrepresented in our sample of 2016 and our results should be taken with care when interpreting the results. Overall the share of females was higher than the share of males in both waves of observations (54.21% in 2012 and 67.20% in 2016). However, the main variables of interest show no noteworthy difference between returnees and non-returnees and therefore the respective interpretation of the results regarding them should be unbiased by attrition, but we are still careful about assuming external validity of results since we operate in a very special cultural context and also observe differences between males and females returning behavior.

Now I want to check whether key characteristics can determine if someone was affected or not by Yolanda, and hence see if some sort of self selection was going on in our sample. Theoretically, there could be certain characteristics which determine if individuals tend to locate themselves in more high-risk areas, such as risk preferences or financial restrictions. Hence I test whether key characteristics determine the geographical location of participants when Yolanda was happening, namely the minimum distance of each village to the storm and the respective classification in high and low intensity villages. The results of this regression can be found in Table 6.3. Additionally we apply mean comparison tests using the sub-sample of villagers from 2012 out of the unbalanced panel. The results suggest that the randomization procedure in 2012 did not work out as planned as there are apparently some differences between northern and southern islanders regarding their overall endowment with financial assets, their human capital, and also some demographics. For example, we observe a substantially higher share of individuals who have vocational training (7.75% vs. 3.25%, p=0.008) in low intensity villages, while the number of individuals with a college degree is a bit lower in high intensity villages (19.72% vs. 15.45%, p=0.136). This finding is inline with what Wamsler et al. (2012) find, namely that individuals with less education tend to be located in high risk areas. We can see from Table 6.3 that the difference in the number of college graduates becomes relevant if we look at the sub-sample of villagers who were present in both waves of observations, where having a college degree is associated with a about 20% lower probability to live in high intensity villages. Conscientiousness also seems to differ substantially between high and low intensity villages in 2012 (0.82 vs. 0.74, p=0.000), which represents a difference of about half a standard deviation. As a result we also observe significant explanatory power of the human capital indicator. Regarding financial capital, we observe that household income was rather lower in high

Table 6.1: Summary statistics of key variables across returnees and non-returnees in high and low intensity villages

Variables	low intensity villages			high intensity villages		
	return=0	return=1		return=0	return=1	
	mean (sd)	mean (sd)	p-value	mean (sd)	mean (sd)	p-value
Human capital	0.67 (0.17)	0.68 (0.17)	0.502	0.75 (0.14)	0.76 (0.13)	0.308
Financial capital	0.12 (0.11)	0.10 (0.10)	0.204	0.11 (0.10)	0.09 (0.09)	0.133
Social capital	0.59 (0.16)	0.57 (0.16)	0.297	0.56 (0.16)	0.57 (0.15)	0.949
Solidarity	0.51 (0.25)	0.49 (0.23)	0.247	0.43 (0.23)	0.43 (0.23)	0.960
Age	40.18 (11.23)	42.33 (10.48)	0.042**	40.80 (10.58)	41.53 (10.02)	0.502
Monthly household income (*1,000PHP)	4.49 (5.17)	4.11 (4.07)	0.399	4.11 (4.63)	3.52 (3.03)	0.140
Years living in village	29.96 (16.32)	33.15 (15.96)	0.042**	31.35 (16.49)	32.25 (15.90)	0.603
Risk aversion (surveys)	0.37 (0.26)	0.35 (0.27)	0.459	0.30 (0.27)	0.30 (0.26)	0.835
Risk aversion (experiments)	0.39 (0.49)	0.47 (0.50)	0.143	0.50 (0.50)	0.44 (0.50)	0.287
Gender	0.52 (0.50)	0.62 (0.49)	0.049**	0.41 (0.49)	0.58 (0.50)	0.002***
Elementary school	0.22 (0.41)	0.22 (0.42)	0.907	0.20 (0.40)	0.31 (0.46)	0.016**
High school	0.50 (0.50)	0.50 (0.50)	1.000	0.54 (0.50)	0.55 (0.50)	0.832
Vocational training	0.06 (0.24)	0.09 (0.29)	0.277	0.04 (0.20)	0.03 (0.16)	0.554
College	0.22 (0.41)	0.18 (0.39)	0.393	0.22 (0.42)	0.11 (0.31)	0.003***
Reduction of food intake	0.53 (0.50)	0.57 (0.50)	0.380	0.65 (0.48)	0.74 (0.44)	0.081*
Debt $\geq 5,000PHP$	0.34 (0.47)	0.31 (0.46)	0.533	0.39 (0.49)	0.36 (0.48)	0.511
N	198	228		148	221	

Table 6.2: Explanatory power of key characteristics from 2012 on returning to workshop in 2016

	(1) whole sample	(2) low intensity	(3) high intensity
Human capital	0.20	0.08	0.27
	(0.17)	(0.26)	(0.20)
Financial capital	0.07	-0.34	0.29
	(0.22)	(0.29)	(0.34)
Social capital	-0.12	-0.18	0.04
	(0.12)	(0.19)	(0.15)
Solidarity	-0.02	-0.09	0.12
	(0.12)	(0.14)	(0.16)
Age	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Monthly income ($*1000PHP$)	-0.01	0.00	-0.01
	(0.01)	(0.01)	(0.01)
Years living in village	0.00*	0.00**	0.00
	(0.00)	(0.00)	(0.00)
Survey measured risk aversion	-0.03	-0.08	0.03
	(0.08)	(0.14)	(0.08)
Relative risk aversion	0.02	0.08	-0.06
	(0.04)	(0.06)	(0.05)
Female	0.14***	0.10	0.21***
	(0.04)	(0.06)	(0.06)
High school	-0.04	0.03	-0.09
	(0.05)	(0.08)	(0.06)
Vocational training	0.01	0.13	-0.19
	(0.11)	(0.14)	(0.21)
College	-0.15**	-0.03	-0.28***
	(0.06)	(0.08)	(0.08)
Reduced food	0.07	0.02	0.10
	(0.05)	(0.07)	(0.09)
Debt$\geq 5.000PHP$	-0.04	-0.07	-0.05
	(0.04)	(0.06)	(0.04)
Constant	0.35*	0.42	0.25
	(0.18)	(0.28)	(0.29)
Observations	776	416	360
F	3.77	4.86	87.18
R^2	0.05	0.05	0.09
Adjusted R^2	0.03	0.01	0.05

Robust standard errors in parentheses, clustered by village

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

intensity villages (3,754PHP vs. 4,288PHP, p=0.076) and households which lack liquid assets to finance food intake are rather situated in high intensity areas (62.95% vs. 52.40%, p=0.000). However, individuals with saving larger than 1,000PHP are rather living in high intensity areas (21.14% vs. 16.67%, p=0.121) and we can see explanatory power of having savings in the regression both in the balanced and unbalanced panel. Overall financial capital also correlates quite well with living in high intensity areas, whereas individuals endowed with low financial assets are rather living in the north of the island. Social capital also seems to be lower in the north of the island, although social capital is only able to explain variance in relative distance to the typhoon in the unbalanced part of the pane. The findings above suggest that there are substantial differences between high and low intensity villagers before Yolanda hit them respectively, and therefore we cannot exclude the possibility of self selection taking place, whereas I can only speculate about the origins of this differences, since we were quite certain that there are no cultural differences between the villages we visited. The island has a diameter of about 100km and we made sure that only rural small scale villages were taken into the randomization procedure (see section3.1). However, it seems that even with our careful randomization we were not able to find comparable samples between villages. Therefore it seems that the results we find should be taken with a grain of salt since we cannot exclude selection effects and be 100% certain about the external validity of our results regarding effects of the typhoon over time. This might explain why first difference and fixed effects estimation lead us to different conclusions regarding the effect of typhoon exposure on human capital. In Table 5.19 we found no significant effect of typhoon exposure on human capital, while Table 5.20 suggested otherwise. Paired with the observation that human capital was substantially larger and already quite high in high intensity villages in 2012 (0.76 vs. 0.68, p=0.000), and that human capital did not develop substantially in high intensity villages and only increased in low intensity villages to reach higher levels in 2016 (0.77 vs. 0.76, p=0.226), it seems that we can no longer exclude the possibility that the results from fixed effects regression are biased by regression to the mean effects and that the effect of the typhoon on human capital is an artifact of this development.

Now we are going to have a look at migration and avoidance of the typhoon and the following events that occurred because of it. At one point in 2012 we collected migration lists with the help of village kagawats. We checked whether or not people migrated away from their villages somewhere between our two waves where we conducted our study. Five of our participants migrated away from their

Table 6.3: Explanatory power of key characteristics from 2012 on distance to Yolanda and living in high intensity areas

	unbalanced panel		balanced panel		unbalanced panel		balanced panel	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Relative distance	High intensity	Relative distance	High intensity	Relative distance	High intensity	Relative distance	High intensity
Human capital	-0.41***	0.79***	-0.38***	0.84***				
	(0.07)	(0.10)	(0.09)	(0.13)				
Financial capital	0.31***	-0.45***	0.37**	-0.59**				
	(0.11)	(0.16)	(0.16)	(0.23)				
Social capital	0.16*	-0.28**	0.13	-0.23				
	(0.08)	(0.12)	(0.11)	(0.16)				
Age	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.05**	-0.06*	0.02	-0.03	0.06***	-0.07**	0.02	-0.03
	(0.02)	(0.03)	(0.03)	(0.05)	(0.02)	(0.03)	(0.03)	(0.05)
Status: single	0.04	-0.02	0.05	-0.02	0.02	0.00	0.05	-0.02
	(0.03)	(0.04)	(0.04)	(0.06)	(0.03)	(0.05)	(0.04)	(0.06)
High school					0.04	-0.02	0.07**	-0.07
					(0.03)	(0.04)	(0.04)	(0.05)
Vocational training					0.11**	-0.17**	0.15**	-0.29***
					(0.05)	(0.08)	(0.07)	(0.10)
College					0.08*	-0.09	0.15***	-0.19**
					(0.04)	(0.06)	(0.06)	(0.08)
Conscientiousness					-0.35***	0.68***	-0.40***	0.83***
					(0.07)	(0.09)	(0.08)	(0.12)
Regular income					0.04	-0.07	0.08*	-0.12**
					(0.03)	(0.04)	(0.04)	(0.06)
Monthly income ($*1000PHP$)					0.00	-0.01	0.01	-0.01*
					(0.00)	(0.00)	(0.00)	(0.01)
Savings$\geq$ $1.000PHP$					-0.08**	0.13***	-0.16***	0.23***
					(0.03)	(0.05)	(0.04)	(0.06)
Debt$\geq$ $5.000PHP$					-0.05**	0.06*	-0.05	0.08*
					(0.03)	(0.04)	(0.03)	(0.05)
Reduced food					-0.12***	0.17***	-0.16***	0.20***
					(0.03)	(0.04)	(0.04)	(0.05)
Trust: institutions					-0.03	-0.10	-0.05	-0.03
					(0.09)	(0.13)	(0.12)	(0.17)
Solidarity					0.16***	-0.25***	0.08	-0.14
					(0.05)	(0.07)	(0.07)	(0.10)
Trust: bonding					0.14**	-0.12	0.12	-0.09
					(0.06)	(0.08)	(0.08)	(0.12)
Trust: general					0.02	-0.01	0.05	-0.08*
					(0.03)	(0.04)	(0.03)	(0.05)
Club memberships					-0.08***	0.11***	-0.06**	0.08**
					(0.02)	(0.03)	(0.03)	(0.04)
Voluntary work					0.01**	-0.01***	0.01*	-0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
Household size					0.01	-0.01	0.01	-0.02*
					(0.01)	(0.01)	(0.01)	(0.01)
Number of friends					-0.00	0.00	-0.01***	0.01***
					(0.00)	(0.01)	(0.00)	(0.00)
Constant	0.61***	0.18	0.58***	0.19	0.57***	0.24*	0.65***	0.12
	(0.09)	(0.12)	(0.11)	(0.17)	(0.10)	(0.15)	(0.14)	(0.20)
Observations	777	777	439	439	770	770	434	434
F	7.87	12.14	4.36	8.23	6.78	8.45	6.25	9.17
R^2	0.05	0.08	0.04	0.08	0.14	0.16	0.18	0.22
Adjusted R^2	0.05	0.07	0.03	0.07	0.11	0.13	0.14	0.19

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

villages after 2012, four of them returned before 2016. This means that only one person from our sample from 2012 was no longer available in the village for reasons which I am not able to reenact. In the literature it has been argued that there is a higher chance of people migrating away due to disasters (Brock and Paul, 2003; Blaikie et al., 2004; Mallick and Vogt, 2012), but in our sample there was almost no migration similar to a study by Paul (2005) conducted in Bangladesh where no migration was occurring at all after a strong tornado. Since it seems that people only migrate away permanently after a disaster if their possibilities for a sustainable livelihood are taken away completely (cf. Afifi and Warner, 2008), it does not seem exceptionally that we do not observe permanent migration in our sample. As we have described before in section 4.2, avoidance of the typhoon was apparently not feasible, since most of our participants stayed in the same village when the typhoon made landfall. Hence we can safely assume that avoidance by the typhoon does not distort our results in any way.

6.0.2 Remembering the last workshop

In this subsection i want to explore if individual behavior in the experiments was influenced by remembering the last session. We asked individuals after the experiments if they remember playing these games before and also some probably sensitive questions about how they coped to keep their payout secret, and how other villagers treated them after the games. From the participants which returned to our workshop in 2016, about 68% remembered the games quite well, whereas the remaining 32% could no longer remember the content of the games from last time (3.44 vs. 1.36, p=0.000)[2]. About 41% of our participants which remembered the games at least quite well said that they could at least quite well remember the amount of money they earned last time and average satisfaction with the amount of money that was paid last time was also relatively high on average (4.23)[3], which indicates that the incentive that was provided in the experiments was sufficient to motivate behavior. About 14% of returnees regretted their behavior in the last session in some way. About two thirds of our returnees believed in the anonymity of the experimental decisions in 2012, whereas a share of about one third had doubts about our trustworthiness regarding the privacy of their behavior in the games. We also wanted to check if participants felt like we were expecting them to behave in certain ways during the games. About 70% claimed that they did not feel

[2] Answers were given on a five point Likert scale, where one meant "I do not remember the games at all" and five meant "I remember them very well".

[3] Answers were given on a five point Likert scale, where one meant "I was completely dissatisfied" and five meant "I was completely satisfied".

pressured by us to act in certain ways, whereas about 30% indicated that they felt we expected them to decide in certain ways. This could be a sign that individuals were too aware of our presence, which could be a direct result of us leading questionnaires directly by assistants to ensure illiteracy would not be a problem in our study (c.f. Cardenas and Carpenter, 2008). After individuals received their payout, we emphatically advised them to not talk about their earnings in the games to make sure, our presence would not cause conflicts over money or behavior in the experiments, since some of them are surely loaded by moral concerns or social norms regarding solidarity. However, we find that according to self stated behavior about 31% of individuals recalled to have talked to their friends about the amount of money they earned in the games afterward, whereas 69% said that they kept the amount rather secret. We also directly asked if there was some sort of harassment due to their earnings in the games, and about 13% claimed that they were harassed by others because of their decisions in the experiment from 2012. Altogether we see that participation in 2012 might cause individuals to reconsider their behavior from last time and also provides them with some sort of comparative advantage over new participants, since they might have a better idea about the average behavior of others in the games we played. Therefore I want to check whether or not remembering the games has explanatory power over the overall behavior in the solidarity game and risk task in 2016 and hence if caution is needed when we draw results from the unbalanced part of the panel, since results could be distorted by learning effects. I do this by regressing survey items which indicated if people remember the games on the outcomes of the games respectively. The results of these regressions can be found in Table 6.4. Models (1) and (2) show the impact of remembering games on the risk premium which we elicited from the three lotteries, models (3) and (4) the impact on the transfer to anonymous players in the first solidarity game, (5) and (6) on the transfers to anonymous players in the second solidarity game, models (7) and (8) the impact on the transfer to friends in the first solidarity game, (9) and (10) on the transfers to friends in the second solidarity game, and (11)-(18) the impact on the classification of the players in the third game according to our criteria which we described in subsection 5.2.1. The results suggest that there is almost no explanatory power of remembering the games and experimental behavior. We do observe some significant relationships, such as having felt pressure by the experimenter and transfers to anonymous players in the first game ($\beta = -1.61$, $p \leq 0.05$), but do not see this relation for the same kind of transfer in the second solidarity game. Also the effect size is rather small, since an increase by feeling pressure by one point on

the Likert scale is associated with a decrease in transfers by about 1.61PHP, which corresponds to about a twelfth of a standard deviation in transfers. The same goes for the relation between the satisfaction of the amount of money won, perceived harassment due to the amount of money, and the probability of being am altruist or a conditional cooperator in 2016. We observe significant relationships here as well, but effect sizes and overall explanatory power of the variables which indicate remembering the games is rather low, such that we should be able to safely conclude that remembering the games did not influence the behavior of our participants significantly and we can exclude the possibility of learning effects biasing our results at this point.

6.0.3 Priming Yolanda

In 2016, we repeated the solidarity game after activating the minds of our participants towards certain events which may or may not have occurred after Yolanda, as explained in section 3.2. The respective open survey questions which we used to prime our participants can be found in the Appendix in section A7 and the following pages. We randomly selected groups of three to be either primed positively, neutrally, or negatively towards Yolanda. Positive priming would mean us asking about individuals helping each other after the catastrophe, negative priming meant that we asked about conflict or corruption, and neutral priming consisted of open questions regarding the events of the day which happened until the workshop. We made sure that in each village there would be three groups each that were either positively, negatively or neutrally primed. Hence we obtained nine positively, nine negatively and nine neutrally primed individuals per village respectively. Now we compare if primed individuals behaved differently in the solidarity game than in the rounds before and also compare the behavior between primed groups. Therefore we should be able to see whether activating the memories of our participants towards Yolanda leads to differences in behavior.

Table 6.5 shows the results of a simple OLS regression of priming dummies on transfers in the solidarity game, using individuals which were neutrally prime as a baseline. We can observe that priming seems to have influenced individuals from high and low intensity villages in different ways than we had expected. While we observe that being primed positively is associated with lower transfers to anonymous players in the solidarity game when an individual stems from low intensity villages (models (1) and (5)), we see a reverse effect of priming in high intensity villages (models (9) and (13)). Additionally, while there seems to be no difference between the behavior of neutrally and negatively primed individuals in

Table 6.4: Effect of remembering games from 2012 on experimental behavior in 2016

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Risk premium	Risk premium	Transfer to anonymous (1)	Transfer to anonymous (1)	Transfer to anonymous (2)	Transfer to anonymous (2)	Transfer to friend (1)	Transfer to friend (1)	Transfer to friend (2)	Transfer to friend (2)	Altruist	Altruist	Egoist	Egoist	Conditional cooperator	Conditional cooperator	Other type	Other type
remembers games	-0.60		-0.50		-0.33		-0.16		0.05		-0.01		0.00		-0.00		0.01	
	(0.71)		(0.56)		(0.50)		(0.57)		(0.40)		(0.01)		(0.01)		(0.01)		(0.01)	
satisfaction with money won		0.67		0.10		0.97		-0.05		1.79		0.04**		-0.00		-0.01		-0.01
		(2.19)		(1.10)		(1.48)		(1.28)		(1.23)		(0.02)		(0.02)		(0.02)		(0.02)
regrets decisions		-2.52		1.81		1.37		1.48		0.69		0.02		-0.00		-0.03		0.01
		(1.58)		(1.18)		(0.98)		(1.00)		(1.09)		(0.02)		(0.02)		(0.03)		(0.03)
believed in anonymity of experiment		-0.36		0.10		-0.56		0.72		-0.52		-0.00		0.03		-0.03		-0.00
		(1.47)		(0.86)		(1.01)		(0.84)		(1.15)		(0.02)		(0.02)		(0.03)		(0.02)
felt pressured to behave in certain way		1.75		-1.61**		-0.17		-1.30		-0.59		0.01		-0.00		0.01		-0.00
		(1.18)		(0.70)		(1.16)		(0.94)		(1.14)		(0.03)		(0.02)		(0.02)		(0.02)
talked to friends about money won		-0.21		-0.19		0.93		0.44		0.03		0.01		-0.03*		0.00		0.01
		(1.28)		(0.72)		(0.80)		(0.89)		(0.93)		(0.02)		(0.02)		(0.02)		(0.01)
was harassed because of decisions in experiment		1.53		0.46		-1.06		0.38		0.32		-0.04**		0.01		0.06**		-0.03
		(2.13)		(1.18)		(1.25)		(1.50)		(1.22)		(0.02)		(0.03)		(0.03)		(0.02)
Constant	-5.56**	-11.09	27.30***	23.99***	33.69***	27.49***	34.35***	29.32***	34.41***	26.75***	0.25***	-0.00	0.16***	0.17*	0.52***	0.56***	0.05***	0.16
	(2.38)	(11.49)	(1.75)	(6.34)	(1.29)	(9.10)	(1.79)	(6.57)	(1.40)	(7.87)	(0.03)	(0.11)	(0.03)	(0.10)	(0.04)	(0.17)	(0.02)	(0.11)
Observations	690	260	806	296	806	296	806	296	806	296	806	296	806	296	806	296	806	296
F	0.72	1.09	0.78	1.75	0.42	1.62	0.08	1.01	0.02	0.86	1.74	1.97	0.16	1.27	0.09	1.36	1.24	0.45
R^2	0.00	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
Adjusted R^2	-0.00	-0.01	0.00	-0.00	-0.00	-0.01	-0.00	-0.01	-0.00	-0.01	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	-0.01

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

low intensity villages, there seems to be a positive effect on transfers of negative priming in high intensity villages on transfers to friends and anonymous players (models (10), (13), and (14)). We also look at the within variation in transfers by looking at the difference between mean transfers in the first and second solidarity game and transfers in the primed solidarity game. We see that positive priming led to higher transfers to known players compared to transfers in the first and second game if an individual was primed positively in low intensity villages (models (4) and (8)), while there are only significant differences in the transfers towards anonymous players compared to the baseline in high intensity villages (models (11) and (15)).

These results show that although we see no causal long term effects of disaster exposure on solidarity transfers over time, there is still some effect prevalent when we purposely activate the memories of our participants towards Yolanda. This could mean that the typhoon caused long term psychological "scars" which influence individuals on a subconscious level.

6.0.4 Limitations

In this section I want to discuss a little bit about possible limitations of this study. First and foremost, I want to point out the special context in which this study operates, namely strictly looking at coastal villagers from the Philippines, with a very distinct set of cultural and social identities. I already discussed for example the concept of "pakikipagkapwa" which might be already a long term adaption to natural disasters, and maybe there is no more room for long term adaption in other places since Filipinos have already a cultural heritage with regard to natural disasters in general. Therefore it could be that the results which I find in this study are distinctly attributable to these type of villagers in this social and cultural context, while a similar study conducted in other regions of the world might find somewhat different results. Another limitation of this study is that it looks solely at one distinct event - typhoon Yolanda, which was extraordinary in its path and intensity. The question I want to raise at this point is: Was Yolanda too strong to observe significant contributions of some adaptive capacities to disaster resilience indicators? If that is the case, the conclusions of this study might be flawed in a sense that I cannot attribute benefits for some adaptive capacities, while those benefits might very well be existent if a disaster is not as strong as Yolanda. Therefore it might be that some of the measured adaptive capacities might function better if the shock which we look at is not too large. But due to the nature of our data we cannot extrapolate such relations. Furthermore, due

Table 6.5: Effect of priming on behavior in the experimental solidarity game

	low intensity								high intensity							
	(1) transfer to anonymous	(2) transfer to friend	(3) Δtransfer to anonymous	(4) Δtransfer to friend	(5) transfer to anonymous	(6) transfer to friend	(7) Δtransfer to anonymous	(8) Δtransfer to friend	(9) transfer to anonymous	(10) transfer to friend	(11) Δtransfer to anonymous	(12) Δtransfer to friend	(13) transfer to anonymous	(14) transfer to friend	(15) Δtransfer to anonymous	(16) Δtransfer to friend
Negative priming	-2.73	-4.48	2.13	0.77	-3.36	-5.07	1.87	0.33	5.08	6.98*	1.03	0.16	5.78*	7.49*	1.34	-0.04
	(3.17)	(3.23)	(1.53)	(1.66)	(3.18)	(3.20)	(1.57)	(1.87)	(3.17)	(3.50)	(2.15)	(2.31)	(3.19)	(3.60)	(2.38)	(2.33)
Positive priming	-4.11*	-2.49	-0.23	3.35*	-4.63**	-2.91	-0.50	3.13*	4.92*	4.44	3.53**	0.67	6.45**	5.38*	3.69**	0.48
	(2.03)	(2.21)	(1.95)	(1.73)	(2.08)	(2.21)	(1.87)	(1.73)	(2.56)	(2.70)	(1.57)	(2.01)	(2.88)	(2.85)	(1.69)	(2.29)
Age					0.08	0.09	0.03	-0.02					0.08	0.07	0.10	-0.03
					(0.06)	(0.09)	(0.06)	(0.05)					(0.09)	(0.13)	(0.07)	(0.08)
Female					2.30	2.36	1.73	0.96					0.46	2.33	2.52	2.89*
					(2.03)	(2.90)	(1.98)	(2.32)					(1.79)	(2.66)	(1.53)	(1.63)
Monthly income (∗1000PHP)					0.13	0.13	-0.04	-0.05					0.62**	0.42	0.26	0.32
					(0.14)	(0.11)	(0.10)	(0.07)					(0.22)	(0.24)	(0.17)	(0.21)
Household size					-0.14	0.01	-0.45	-0.04					0.26	0.32	0.25	0.23
					(0.22)	(0.24)	(0.28)	(0.23)					(0.31)	(0.29)	(0.41)	(0.44)
High school					1.96	4.54*	0.67	3.71					3.97*	1.99	0.06	-1.44
					(2.50)	(2.18)	(1.85)	(2.20)					(1.86)	(2.39)	(0.99)	(1.79)
Vocational training					6.58*	7.10*	4.38***	7.62***					-3.84	-3.88	-7.27	-6.61**
					(3.37)	(3.68)	(1.20)	(2.35)					(5.09)	(7.55)	(4.64)	(2.50)
College					5.44*	6.98**	4.18*	5.98*					14.58***	10.75**	1.21	-0.37
					(3.00)	(2.96)	(2.26)	(2.90)					(4.06)	(4.21)	(2.44)	(3.19)
Constant	32.45***	37.90***	-2.03	-2.13	24.74***	27.57***	-3.53	-4.63*	21.98***	26.83***	-3.13**	-1.35	10.31*	16.54**	-11.59**	-3.35
	(2.09)	(1.86)	(1.76)	(1.24)	(5.34)	(6.21)	(4.74)	(2.57)	(1.76)	(1.82)	(1.07)	(1.12)	(5.07)	(6.90)	(4.44)	(4.24)
Observations	430	430	430	430	426	426	426	426	378	378	378	378	375	375	375	375
F	2.07	1.11	1.74	2.75	2.76	1.03	6.95	2.96	2.29	2.46	2.54	0.06	4.79	11.53	1.51	5.20
R^2	0.01	0.01	0.00	0.01	0.03	0.03	0.03	0.04	0.01	0.02	0.01	0.00	0.08	0.05	0.04	0.03
Adjusted R^2	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-0.00	0.05	0.03	0.02	0.00

Robust standard errors in parentheses, clustered by village

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

to the explorative nature of this analysis we lack dimensions which would have been nice to measure beforehand, for example general health of participants, more information about the physical structure of their housing, or their endowment with natural capital. Hence we might oversee some important factors which contribute to disaster resilience. All of these limitations should provide further ground for potential upcoming studies in this field.

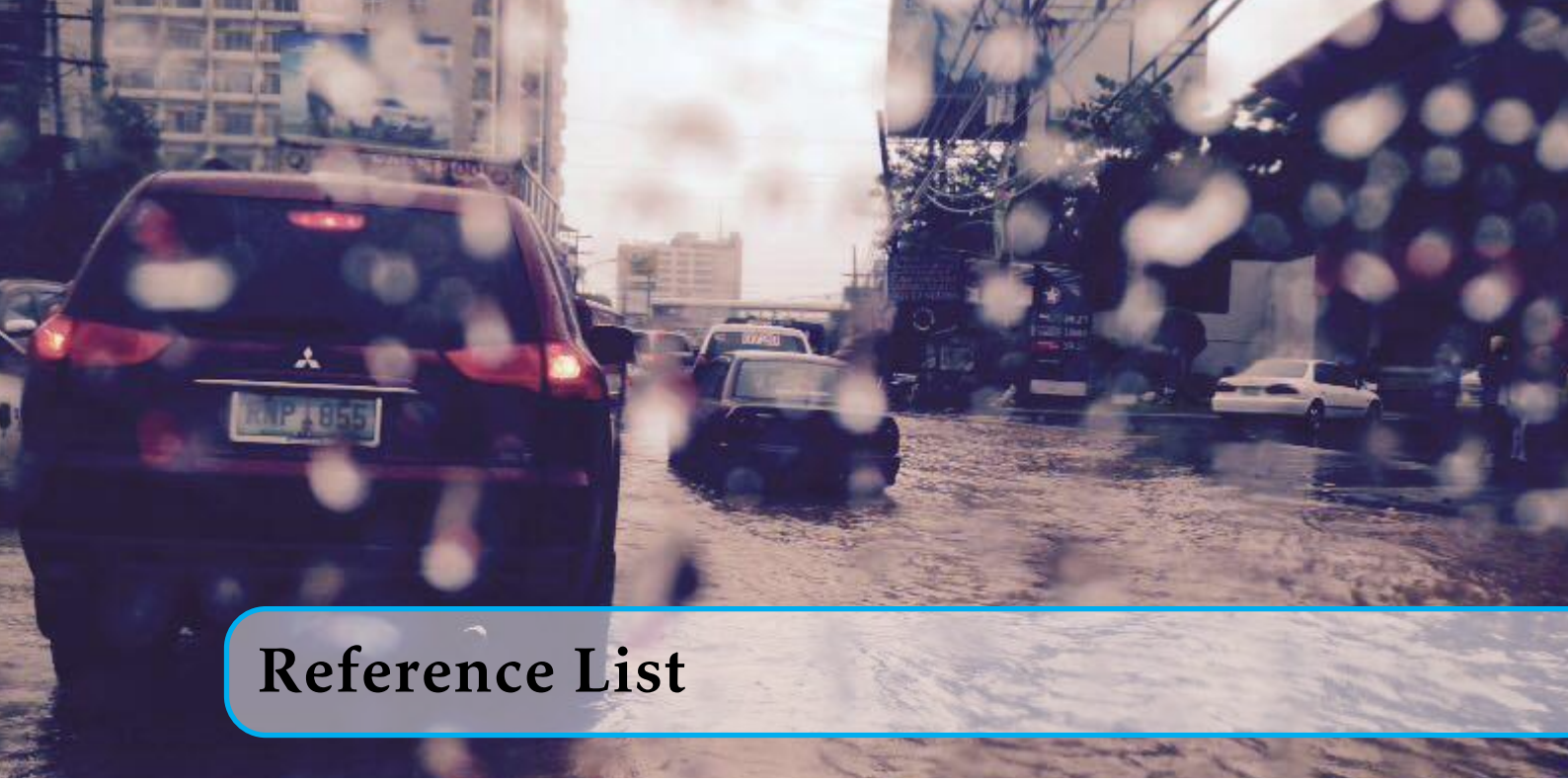
6.1 Conclusion

I conducted a study which investigates the relation between pre-disaster adaptive capacities in the form of human, financial, and social capital and disaster resilience, and also investigates the relation between exogenous disaster exposure and development of capital forms over time. Additionally this study contributes to the literature which investigates the influence of natural disasters on human risk- and social preferences. We made use of a natural experimental setting in the Philippines, where roughly half of our observed part of the population was severely exposed to a strong natural disaster (typhoon Yolanda) while the other half suffered from minor exposure. We collected data about capital forms and incentivized behavior in economic games two years before, and three years after the typhoon. We make use of panel data with 1598, where the balanced part of the panel consists of 449 individuals (895 observations).

Our results provide evidence for the relative importance of financial capital to build disaster resilient households and therefore promote increasing efforts in access to micro-finance and insurance schemes in developing countries, which should enhance households adaptive capacity to bounce back to their initial status. An additional channel which seems promising according to our data is promoting increases in networks of individuals, for example by increasing community participation in general or by including individuals in disaster mitigation and action planning. However, our data shows that individuals with larger networks were also perceiving less help from friends and neighbors despite having needed less recovery time, which may indicate that individuals with larger networks had higher expectations towards parts of their networks with regard to sharing help after a disaster. In general, the largest part of adaptive capacities which we tested for their predictive power of resilience indicators fail to explain the respective dependent variables. Hence I conclude that we need to reconsider our assumptions of those adaptive capacities, since not all of them have played an important role in the disaster recovery process in the Philippines.

Regarding the effect of natural disasters on adaptive capacities and human risk and social preferences we see that I could not identify a causal relation between changes in experimentally measured behavior in a risk game, as well as behavior in an incentivized solidarity game. We find negative effects on the conscientiousness of individuals, although those results can only be interpreted with low confidence since I cannot exclude regression to the mean or selection effects biasing this result. The same goes for positive effects of typhoon exposure on generalized trust. Therefore I could not find sufficient evidence for causal relations between changes

in adaptive capacities, risk or social preferences and disaster exposure.
The results of this study show important implications for planners of disaster risk reduction and show where investments to build disaster resilience may be most promising. One caveat of this study is the lack on information about physical or natural capital and hence can only really say something about the relative importance of human, financial and social capital to increase adaptive capacity.



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7. Appendix

A1 Graphs and figures

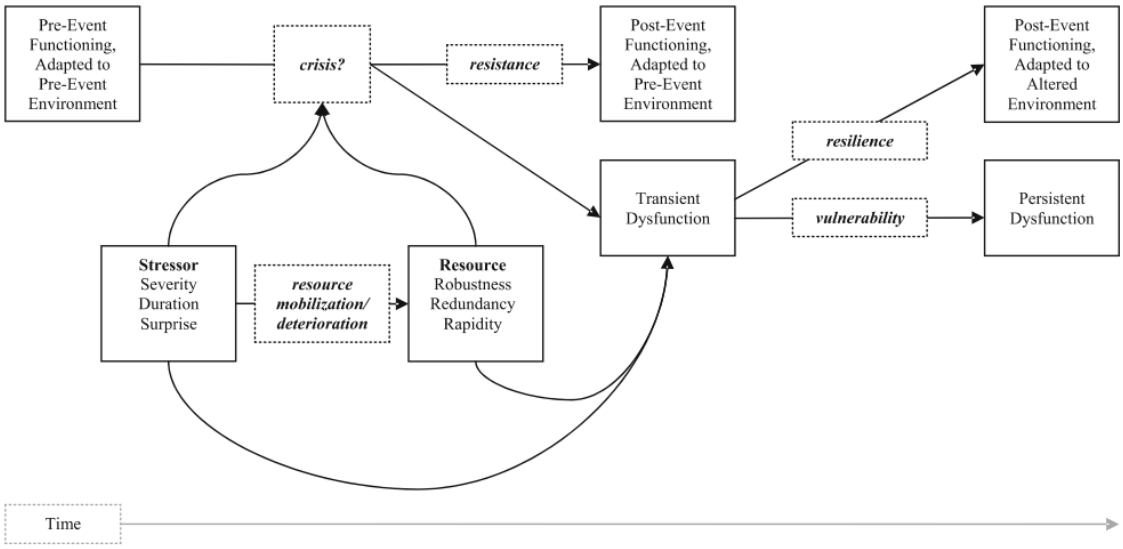


Figure A1.1: The temporality of events and the role of adaptive capacities in disaster resilience, taken from Norris et al. (2008)

Figure A1.2: A Photograph of a typical experimental session

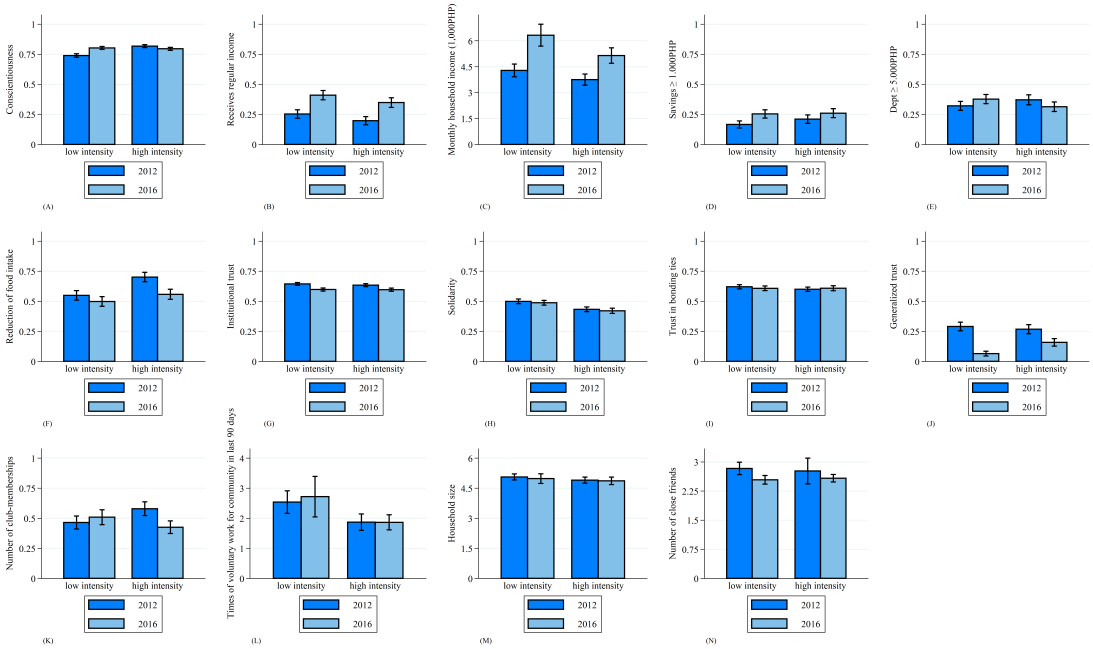


Figure A1.3: Changes in capital indicators by intensity (balanced part of the panel, n=1151); part (A): change in human capital indicators (conscientiousness); parts(B)-(F): change in financial capital indicators (regular income, monthly household income, savings, debt, and lack of financial endowment to ensure daily food intake); parts (G)-(N): change in social capital indicators (solidarity, trust in bonding ties, general trust, club memberships, voluntary community work, household size, and number of close friends)

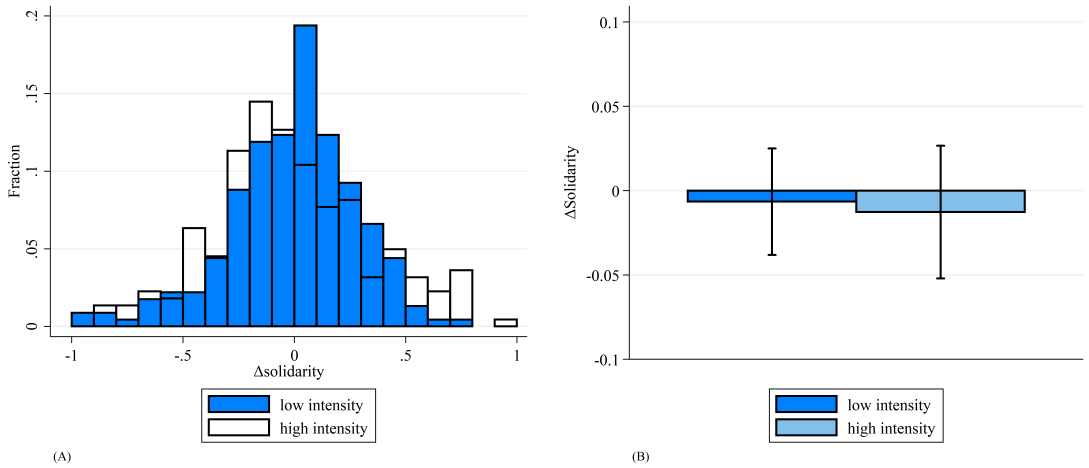


Figure A1.4: Changes in solidarity over time and intensity (balanced part of the panel, n=449); part (A): distribution of changes in solidarity index over time; part(B): mean changes in solidarity over time over intensity

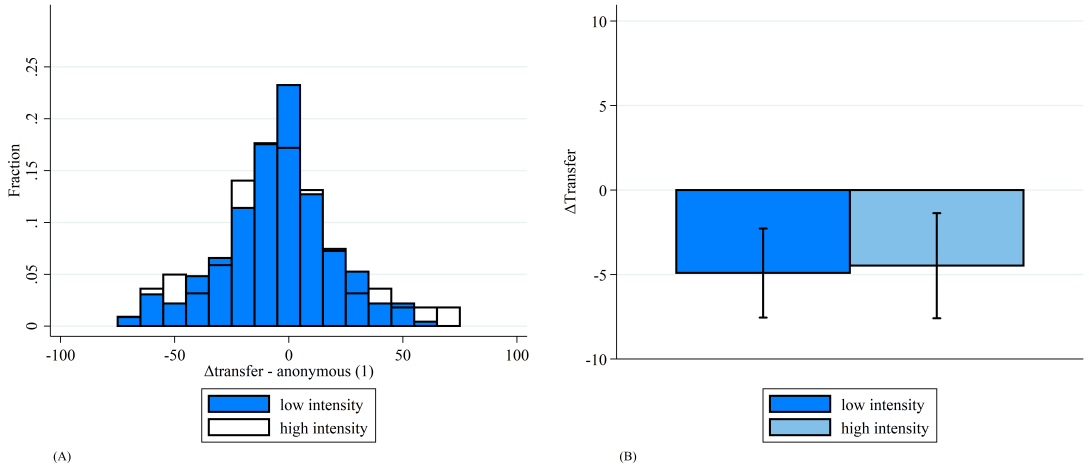


Figure A1.5: Changes in transfer to anonymous players in first solidarity game over time and intensity (unbalanced part of the panel, n=449); part (A): distribution of changes in transfer to anonymous players in first solidarity game over time; part(B): mean changes in transfer to anonymous players in first solidarity game over time over intensity

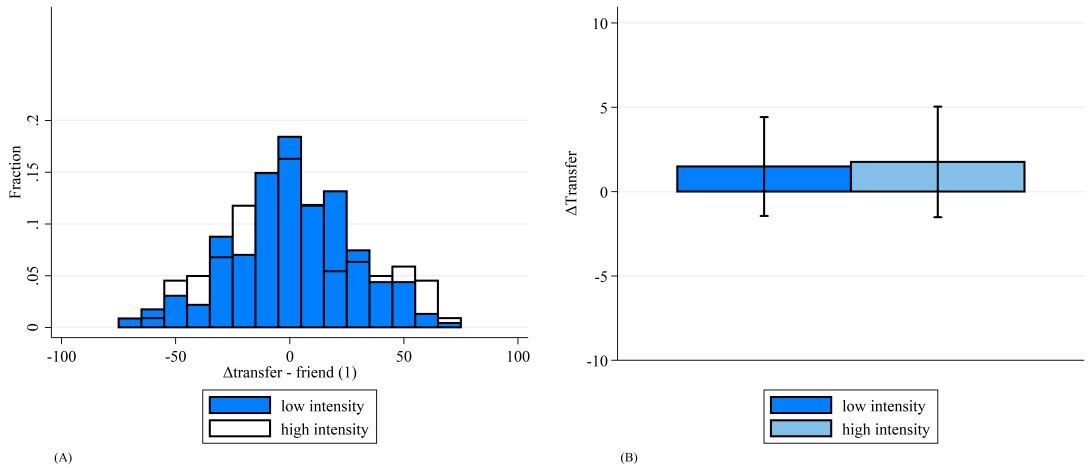


Figure A1.6: Changes in transfer to known players in first solidarity game over time and intensity (balanced part of the panel, n=449); part (A): distribution of changes in transfer to known players in first solidarity game over time; part(B): mean changes in transfer to known players in first solidarity game over time over intensity

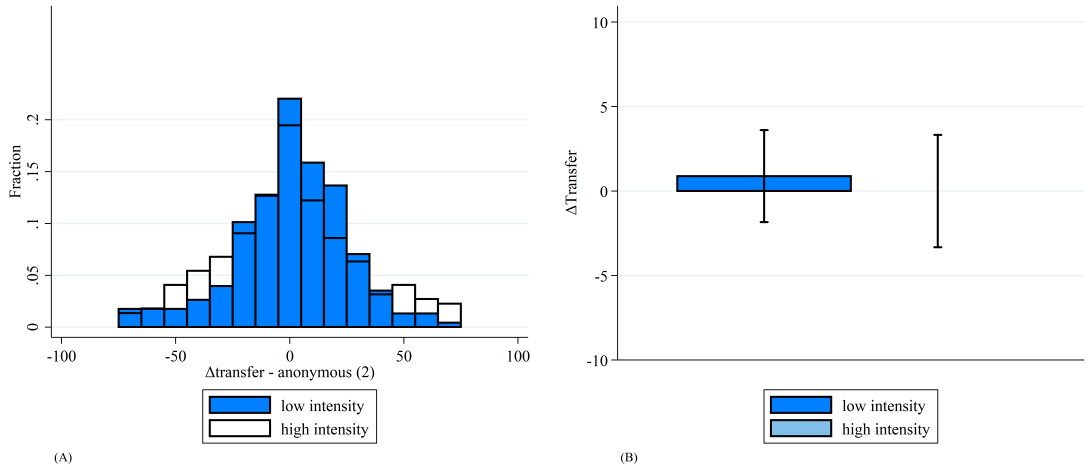


Figure A1.7: Changes in transfer to anonymous players in second solidarity game over time and intensity (balanced part of the panel, n=449); part (A): distribution of changes in transfer to anonymous players in second solidarity game over time; part(B): mean changes in transfer to anonymous players in second solidarity game over time over intensity

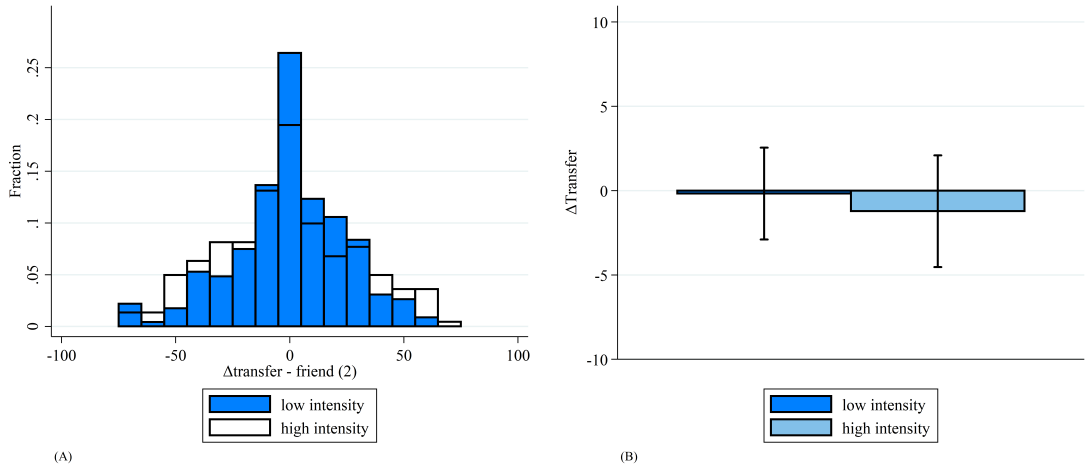


Figure A1.8: Changes in transfer to known players in second solidarity game over time and intensity (balanced part of the panel, n=449); part (A): distribution of changes in transfer to known players in second solidarity game over time; part(B): mean changes in transfer to known players in second solidarity game over time over intensity

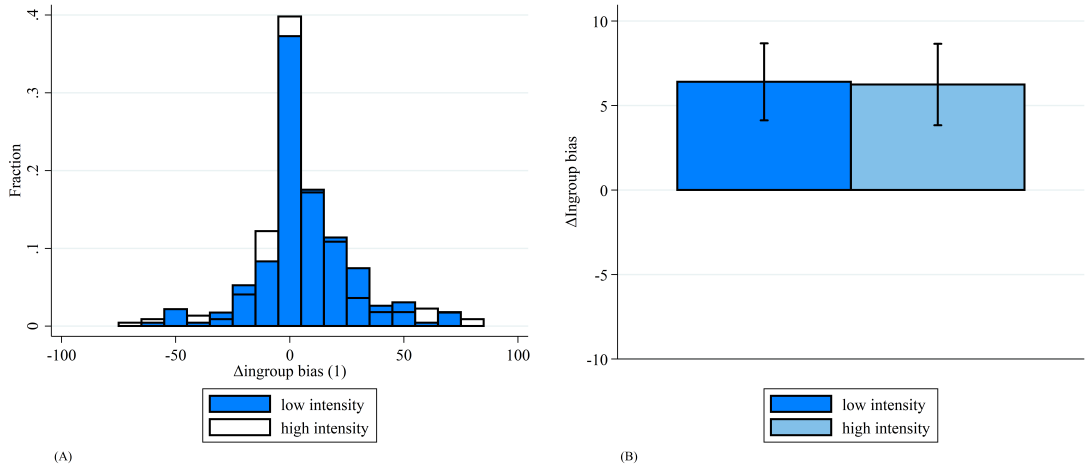


Figure A1.9: Changes in in-group bias in first solidarity game over time and intensity (balanced part of the panel, n=449); part (A): distribution of changes in in-group bias in first solidarity game over time; part(B): mean changes in in-group bias in first solidarity game over time over intensity

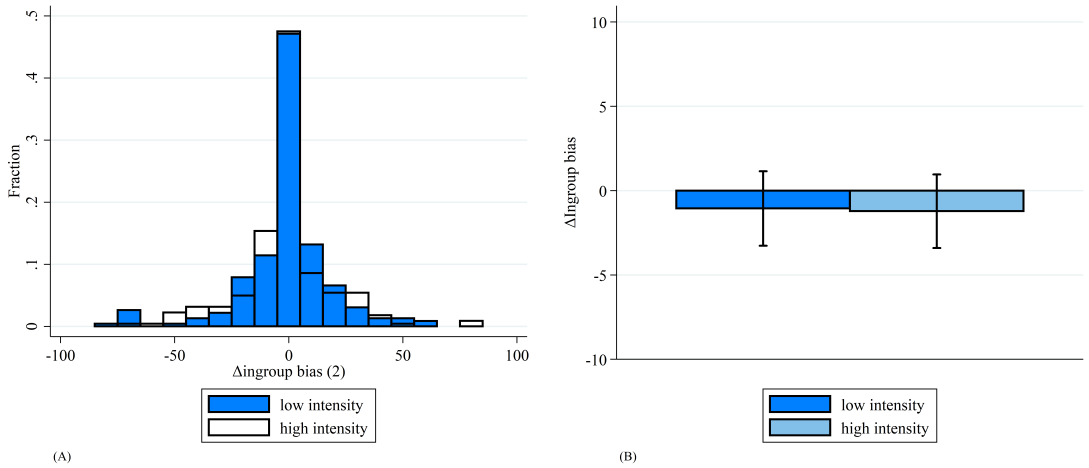


Figure A1.10: Changes in in-group bias in second solidarity game over time and intensity (balanced part of the panel, n=449); part (A): distribution of changes in in-group bias in second solidarity game over time; part(B): mean changes in in-group bias in second solidarity game over time over intensity

A2 Tables

Table A2.1: Timetable of workshops of both waves of observation

Date	Village	Date	Village	Date	Village
August 22nd 2012 August 20th 2016	Baras	September 6th 2012 September 20th 2016	Polopina	September 20th 2012 September 8th 2016	Batonan-Sur
August 23rd 2012 August 17th 2016	Sinogbuhan	September 7th 2012 September 23rd 2016	Talotoan	September 21st 2012 September 9th 2016	Maramig
August 25th 2012 August 18th 2016	Tapikan	September 8th 2012 September 22nd 2016	Maliogliog	September 22nd 2012 September 12th 2016	Paz
August 27th 2012 August 19th 2016	Bucaya	September 9th 2012 August 26th 2016	Nanding Lopez	September 23rd 2012 September 12th 2016	Pucio
August 28th 2012 August 22nd 2016	Santa Rita	September 11th 2012 August 30th 2016	Suclaran	September 24rd 2012 September 16th 2016	Bulanao
August 29th 2012 August 21st 2016	Calampitao	September 13th 2012 August 31st 2016	Sagua	September 25th 2012 September 13th 2016	San Roque
August 30th 2012 August 25th 2016	Paloc Bique	September 14th 2012 September 1st 2016	Lisub-A	September 26th 2012 September 15th 2016	Pajo
August 31st 2012 August 23rd 2016	Cata-An	September 17th 2012 August 24th 2016	Igcondao	September 27th 2012 September 14th 2016	Cubay
September 1st 2012 September 2nd 2016	Paciencia	September 18th 2012 August 29th 2016	Igcawayan	September 28th 2012 September 11th 2016	Igcagay
September 5th 2012 September 21st 2016	Dungon	September 19th 2012 September 7th 2016	Balac-Balac	September 29th 2012 September 3rd 2016	Igdalaguit

Table A2.2: Out-migration (either permanent or temporal) according to official documents from village officials

low intensity villages	out-migration	population (2007 census)	high intensity villages	out-migration	population (2007 census)
Baras	0	1017	Balac-Balac	5	668
Bucaya	15	1648	Batonan-Sur	11	663
Calampitao	0	691	Bulanao	1	327
Cata-An	5	1230	Cubay	2	830
Igcawayan	3	1081	Dungon	0	476
Igconao	16	445	Igcagay	18	539
Igdalaguit	0	1144	Maliog-Liog	0	517
Lisub-A	13	729	Maramig	0	328
Nanding Lopez	2	1315	Pajo	0	538
Paciencia	0	1018	Paz	0	644
Paloc Bigque	0	1017	Polopina	0	3382
Sagua	5	1057	Pucio	0	539
Santa Rita	0	1601	San Roque	4	1028
Sinogbuhan	0	1604	Talotu-An	2	2470
Suclaran	5	1662			
Tapikan	0	317			
Total	49			27	

Table A2.3: correlation between time left until impact and preparatory measures

	reinforcing house	bring property to safer place	store additional food	store additional medicine	other
time until impact	-0.0326	0.0025	0.0218	0.0864	0.0605

Table A2.4: Effect of income and living in high intensity areas on building stabler housing

	(1)	(2)	(3)	(4)
(I) income	0.00***	0.00***		
	(0.00)	(0.00)		
(II) high intensity	0.11		-0.10	
	(0.14)		(0.09)	
(I)x(II)	-0.00*			0.00
	(0.00)			(0.00)
Constant	-0.75***	-0.71***	-0.48***	-0.53***
	(0.10)	(0.06)	(0.06)	(0.05)
Observations	802	802	806	802
Prob > chi^2	0.01	0.00	0.31	0.83
Pseudo R^2	0.02	0.02	0.00	0.00

Table A2.5: Factor loadings of individual perceived affectedness indicators

Variable	Affectedness
Personal pressure	0.85
Relative personal pressure	0.89
Financial pressure	0.81
Relative financial pressure	0.87
Alpha	0.92
Eigenvalue	2.92

Table A2.6: Factor laodings of internal help indicators

Variable	Internal help
Neighbors helped	0.83
Friends helped	0.83
Alpha	0.87
Eigenvalue	1.38

Table A2.7: Factor laodings of external help indicators

Variable	External help
National government helped	0.83
Local government helped	0.83
Barangay council helped	0.77
National NGO helped	0.87
International NGO helped	0.77
Church helped	0.73
Alpha	0.91
Eigenvalue	3.85

Table A2.8: Correlation between income and materials used to build houses before Yolanda

	income (2012)	thatch	bamboo	wood	cement	iron sheets	stone /bricks
income (2012)	1.000						
thatch	-0.118***	1.000					
bamboo	-0.193***	0.351***	1.000				
wood	-0.045	0.025	0.007	1.000			
cement	0.127***	-0.197***	-0.437***	-0.002	1.000		
iron sheets	0.064*	-0.320***	-0.152***	0.122***	0.339***	1.000	
stone/bricks	0.162***	-0.101***	-0.134***	-0.044	0.117***	0.096***	1.000

Table A2.9: Main indicators for the five forms of capital used in this study, balanced panel

	low intensity villages			high intensity villages		
Variables	2012	2016	p-value	2012	2016	p-value
Human capital	0.68	0.77	0.000***	0.76	0.76	0.887
	(0.17	(0.15)		(0.13	(0.14	
Highest degree: elementary school	0.22	0.23	0.739	0.31	0.38	0.134
	(0.42)	(0.42)		(0.46)	(0.49)	
Highest degree: high school	0.50	0.52	0.708	0.55	0.53	0.633
	(0.50)	(0.50)		(0.50)	(0.50)	
Highest degree: college	0.18	0.14	0.310	0.11	0.05	0.012**
	(0.38)	(0.35)		(0.31)	(0.21)	
Highest degree: vocational training	0.09	0.10	0.873	0.03	0.05	0.308
	(0.29)	(0.30)		(0.16)	(0.21)	
Conscientiousness (index from 0-1)	0.74	0.80	0.000***	0.82	0.80	0.067*
	(0.18)	(0.16)		(0.13)	(0.13)	
Financial capital	0.11	0.15	0.000***	0.09	0.15	0.000***
	(0.10)	(0.11)		(0.09	(0.11)	
Receives regular income	0.27	0.41	0.002***	0.18	0.37	0.000***
	(0.45)	(0.49)		(0.39)	(0.48)	
Monthly household income	4112.81	6324.38	0.000***	3516.70	5323.86	0.000***
	(4073.35)	(5166.03)		(3029.11)	(5552.77)	
Savings $\geq 1.000PHP$	0.13	0.26	0.001***	0.21	0.29	0.062*
	(0.34)	(0.44)		(0.41)	(0.45)	
Dept $\geq 5.000PHP$	0.31	0.43	0.005***	0.36	0.34	0.765
	(0.46)	(0.50)		(0.48)	(0.48)	
Reduction of food intake	0.57	0.52	0.259	0.74	0.54	0.000***
	(0.49)	(0.50)		(0.44)	(0.50)	
Social capital	0.57	0.54	0.018**	0.57	0.54	0.085*
	(0.16)	(0.18)		(0.15)	(0.16)	
Institutional trust (index from 0-1)	0.64	0.59	0.001***	0.63	0.60	0.006***
	(0.15)	(0.16)		(0.14)	(0.15)	
Solidarity (index from 0-1)	0.49	0.48	0.760	0.43	0.42	0.590
	(0.23)	(0.25)		(0.23)	(0.27)	
Trust in bonding ties (index from 0-1)	0.60	0.59	0.757	0.60	0.60	0.686
	(0.22)	(0.26)		(0.21)	(0.24)	
Generalized trust	0.34	0.07	0.000***	0.26	0.16	0.007***
	(0.47)	(0.26)		(0.44)	(0.37)	
Number of club-memberships	0.49	0.55	0.364	0.52	0.46	0.298
	(0.72)	(0.82)		(0.67)	(0.61)	
Times of voluntary work for community in last 90 days	2.91	2.51	0.498	1.87	2.11	0.435
	(5.61)	(7.02)		(3.14)	(3.30)	
Household size	5.06	4.98	0.635	4.91	4.87	0.810
	(1.87)	(3.03)		(3.15)	(3.30)	
Number of close friends	2.62	2.62	0.978	2.95	2.71	0.457
	(1.81)	(1.57)		(4.61)	(1.21)	
Barangay kagawat	0.18	0.14	0.257	0.12	0.15	0.406
	(0.03)	(0.02)		(0.02)	(0.02)	
Physical capital						
Used heavy materials in housing before Yolanda		0.32			0.28	
		(0.47)			(0.45)	
Distance of house to the ocean		1701.06			115.81	
		(13427.25)			(330.65)	
N	228	228		221	221	

Table A2.10: Auxiliary regression on human capital components

	(1) High school	(2) Vocational training	(3) College	(4) Structuredness
High school		-0.38***	-0.50***	0.02
		(0.05)	(0.04)	(0.06)
Vocational training	-0.32***		-0.24***	0.08
	(0.04)		(0.04)	(0.05)
College	-0.47***	-0.27***		0.02
	(0.04)	(0.05)		(0.05)
Conscientiousness	0.01	0.07	0.02	
	(0.04)	(0.04)	(0.04)	
Constant	0.00	0.00	-0.00	0.00
	(0.04)	(0.04)	(0.04)	(0.05)
Observations	449	449	449	449
F	59.32	23.19	46.75	0.90
R^2	0.29	0.14	0.24	0.01
Adjusted R^2	0.28	0.13	0.23	-0.00
VIF	1.01	1.15	1.05	1.29

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.11: Auxiliary regression on financial capital components

	(1) Regular income	(2) Monthly income	(3) Savings≥ 1.000PHP	(4) Debt≥ 5.000PHP	(5) Reduced food
Regular income		0.16***	0.01	0.10**	-0.03
		(0.04)	(0.04)	(0.05)	(0.05)
Monthly income (∗1000PHP)	0.19***		0.28***	0.10**	-0.16***
	(0.05)		(0.05)	(0.05)	(0.05)
Savings≥ 1.000PHP	0.01	0.28***		0.20***	-0.21***
	(0.05)	(0.05)		(0.05)	(0.05)
Debt≥ 5.000PHP	0.10**	0.09**	0.17***		0.04
	(0.05)	(0.04)	(0.04)		(0.05)
Reduced food	-0.03	-0.15***	-0.19***	0.04	
	(0.05)	(0.04)	(0.04)	(0.05)	
Constant	-0.00	0.00	-0.00	-0.00	0.00
	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)
Observations	449	449	449	449	449
F	6.82	25.25	25.81	9.12	11.73
R^2	0.06	0.19	0.19	0.08	0.10
Adjusted R^2	0.05	0.18	0.18	0.07	0.09
VIF	1.15	1.08	1.08	1.14	1.13

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.12: Auxiliary regression on social capital components

	(1) Trust - institutions	(2) Solidarity	(3) Trust - bonding	(4) Trust - general	(5) Club memberships	(6) Voluntary work	(7) Household size	(8) Number of friends
Trust: institutions		0.04	0.37***	0.09*	0.06	-0.01	0.07	-0.00
		(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Solidarity	0.04		0.01	0.03	0.08*	0.08*	0.08*	-0.01
	(0.04)		(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Trust: bonding	0.37***	0.01		0.07	0.09*	-0.02	0.02	-0.04
	(0.04)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Trust: general	0.07*	0.03	0.06		-0.03	0.04	-0.02	0.03
	(0.04)	(0.05)	(0.04)		(0.05)	(0.05)	(0.05)	(0.05)
Club memberships	0.06	0.09*	0.08*	-0.03		0.26***	-0.05	0.08
	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)
Voluntary work	-0.01	0.08*	-0.02	0.04	0.26***		0.11**	-0.00
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)
Household size	0.06	0.08*	0.01	-0.02	-0.05	0.10**		0.02
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)		(0.05)
Number of friends	-0.00	-0.01	-0.04	0.03	0.07	-0.00	0.02	
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	
Constant	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	0.00
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Observations	449	449	449	449	449	449	449	449
F	12.52	2.08	12.21	1.34	7.10	6.38	1.71	0.51
R^2	0.17	0.03	0.16	0.02	0.10	0.09	0.03	0.01
Adjusted R^2	0.15	0.02	0.15	0.01	0.09	0.08	0.01	-0.01
VIF	1.05	1.09	1.05	1.09	1.07	1.07	1.09	1.10

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.13: Auxiliary regression on physical capital components

	(1) HH used heavy materials	(2) Distance to ocean
HH used heavy materials		-0.02
		(0.05)
Distance to ocean	-0.02	
	(0.05)	
Constant	0.00	-0.00
	(0.05)	(0.05)
Observations	446	446
F	0.20	0.20
R^2	0.00	0.00
Adjusted R^2	-0.00	-0.00
VIF	1.00	1.00

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.14: Auxiliary regression on all capital components

	(1) High school	(2) Vocational training	(3) College	(4) Structuredness	(5) Regular income	(6) Monthly income	(7) Savings≥ 1.000PHP	(8) Debt≥ 5.000PHP	(9) Reduced food	(10) Trust - institutions	(11) Solidarity	(12) Trust - bonding	(13) Trust - general	(14) Club memberships	(15) Voluntary work	(16) Household size	(17) HH used heavy materials	(18) Distance to ocean	(19) Number of friends
High school		-0.37***	-0.48***	0.02	0.06	0.01	0.00	0.00	-0.05	-0.01	0.00	-0.06	-0.01	0.06	0.02	-0.03	0.06	0.00	-0.06
		(0.05)	(0.04)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)
Vocational training	-0.33***		-0.27***	0.08	0.03	0.09*	-0.05	-0.03	-0.15***	-0.01	0.10*	-0.00	-0.01	-0.04	0.06	-0.09*	0.03	0.12**	-0.01
	(0.04)		(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
College	-0.50***	-0.32***		0.02	0.11**	0.14***	0.00	-0.01	-0.12**	-0.02	0.04	-0.04	0.00	0.09*	-0.03	-0.07	0.06	0.10*	-0.10*
	(0.04)	(0.05)		(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)
Conscientiousness	0.01	0.07	0.01		-0.04	0.01	0.06	-0.05	0.03	0.01	-0.02	0.10**	-0.05	0.09**	0.12**	-0.01	-0.04	-0.02	-0.03
	(0.04)	(0.04)	(0.04)		(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Regular income	0.05	0.03	0.09**	-0.05		0.12**	0.02	0.07	0.02	0.02	0.01	0.04	0.01	0.20***	0.08	-0.09*	0.12**	-0.02	0.09*
	(0.04)	(0.05)	(0.04)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Monthly income (*1000PHP)	0.01	0.09*	0.12***	0.01	0.13**		0.28***	0.06	-0.12**	-0.04	-0.02	0.01	-0.04	0.12**	0.03	0.13**	-0.01	0.02	0.00
	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Savings≥ 1.000PHP	0.00	-0.05	0.00	0.08	0.03	0.28***		0.19***	-0.20***	-0.05	0.10*	-0.04	0.13**	-0.04	-0.05	-0.11**	-0.02	-0.05	-0.10*
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Debt≥ 5.000PHP	0.00	-0.03	-0.01	-0.06	0.06	0.05	0.17***		0.06	-0.03	0.02	-0.01	-0.01	0.17***	-0.03	0.06	-0.06	0.17***	-0.03
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Reduced food	-0.04	-0.14***	-0.09**	0.03	0.02	-0.11**	-0.19***	0.06		0.01	-0.03	0.01	0.01	-0.10**	-0.00	0.10**	0.02	-0.05	-0.08
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Trust: institutions	-0.01	-0.01	-0.01	0.01	0.03	-0.03	-0.05	-0.03	0.01		0.07	0.37***	0.11**	0.07	-0.02	0.06	-0.00	-0.10*	-0.01
	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Solidarity	0.00	0.09*	0.03	-0.02	0.01	-0.01	0.09*	0.02	-0.03	0.07		0.01	-0.00	0.05	0.08*	0.11**	-0.01	0.20***	0.03
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Trust: bonding	-0.05	-0.00	-0.03	0.11**	0.04	0.01	-0.04	-0.01	0.01	0.37***	0.01		0.08	0.07	-0.03	0.01	-0.04	0.03	-0.11**
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Trust: general	-0.01	-0.01	0.00	-0.05	0.01	-0.04	0.11**	-0.01	0.01	0.09**	-0.00	0.07		-0.03	0.04	0.01	0.03	0.09*	0.10**
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)		(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Club memberships	0.06	-0.04	0.08*	0.11**	0.23***	0.12**	-0.05	0.19***	-0.12**	0.08	0.06	0.07	-0.04		0.23***	-0.04	0.06	0.01	-0.02
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.06)	(0.05)	(0.05)
Voluntary work	0.01	0.05	-0.03	0.12**	0.08	0.02	-0.04	-0.03	-0.00	-0.02	0.08*	-0.03	0.04	0.20***		0.12**	-0.01	-0.00	0.05
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)		(0.05)	(0.05)	(0.05)	(0.05)
Household size	-0.02	-0.08*	-0.05	-0.01	-0.08*	0.11**	-0.10**	0.06	0.09**	0.05	0.11**	0.01	0.01	-0.03	0.11**		0.04	-0.04	-0.05
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)		(0.05)	(0.05)	(0.05)
Number of friends	0.04	0.02	0.04	-0.04	0.10**	-0.01	-0.02	-0.05	0.02	-0.00	-0.01	-0.04	0.03	0.05	-0.00	0.03		0.01	-0.02
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)		(0.05)	(0.05)
HH used heavy materials	0.00	0.11**	0.08*	-0.03	-0.02	0.02	-0.04	0.16***	-0.05	-0.09*	0.21***	0.03	0.09*	0.01	-0.00	-0.04	0.01		-0.03
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)		(0.05)
Distance to ocean	-0.04	-0.01	-0.07*	-0.03	0.08*	0.00	-0.08*	-0.03	-0.07	-0.01	0.03	-0.09**	0.10**	-0.02	0.05	-0.05	-0.02	-0.03	
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	
Constant	-0.00	0.00	-0.00	0.01	-0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.01	-0.00	-0.00	0.01	-0.00	0.00	0.00
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Observations	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446
F	10.22	6.05	11.18	1.57	4.62	7.27	7.11	4.09	4.44	5.55	3.00	5.63	1.37	7.81	3.22	2.10	0.73	3.54	1.33
R^2	0.30	0.20	0.32	0.06	0.16	0.23	0.23	0.15	0.16	0.19	0.11	0.19	0.05	0.25	0.12	0.08	0.03	0.13	0.05
Adjusted R^2	0.27	0.17	0.29	0.02	0.13	0.20	0.20	0.11	0.12	0.16	0.07	0.16	0.01	0.22	0.08	0.04	-0.01	0.09	0.01
VIF	1.16	1.18	1.16	1.21	1.19	1.18	1.18	1.19	1.19	1.19	1.20	1.19	1.21	1.18	1.20	1.20	1.21	1.20	1.21

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.15: Effect of five capital forms indices on recovery time with control variables

	(1)	(2)	(3)	(4)	(5)
Human capital	0.03				0.04
	(0.04)				(0.05)
Financial capital		-0.10**			-0.10**
		(0.04)			(0.04)
Social capital			0.04		0.04
			(0.06)		(0.06)
HH used heavy materials				-0.05	-0.04
				(0.04)	(0.04)
Distance to ocean				0.04	0.05
				(0.03)	(0.04)
Age	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Female	0.05	0.04	0.05	0.04	0.05
	(0.10)	(0.10)	(0.10)	(0.10)	(0.11)
Status: single	0.01	0.04	0.02	0.02	0.04
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.38	-0.40	-0.39	-0.40	-0.48*
	(0.27)	(0.27)	(0.28)	(0.26)	(0.29)
Observations	433	433	433	430	430
F	2.33	2.09	2.33	2.14	1.77
R^2	0.15	0.16	0.16	0.16	0.17
Adjusted R^2	0.08	0.09	0.09	0.08	0.09

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.16: Effect of five capital forms indices on recovery costs with control variables

	(1)	(2)	(3)	(4)	(5)
Human capital	0.04				0.03
	(0.05)				(0.04)
Financial capital		0.05			0.04
		(0.07)			(0.07)
Social capital			0.04		0.04
			(0.05)		(0.05)
HH used heavy materials				0.04	0.04
				(0.05)	(0.05)
Distance to ocean				0.01	0.01
				(0.01)	(0.01)
Age	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.03	0.03	0.03	0.03	0.04
	(0.09)	(0.09)	(0.10)	(0.10)	(0.09)
Status: single	-0.12	-0.12	-0.11	-0.12	-0.12
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.26	0.30	0.26	0.31	0.29
	(0.39)	(0.40)	(0.40)	(0.39)	(0.40)
Observations	444	444	444	444	444
F	5.71	5.62	5.74	5.49	4.98
R^2	0.26	0.26	0.26	0.26	0.26
Adjusted R^2	0.20	0.20	0.20	0.20	0.19

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.17: Effect of five capital forms indices on time until impact with control variables

	(1)	(2)	(3)	(4)	(5)
Human capital	0.02				0.01
	(0.05)				(0.05)
Financial capital		0.07			0.06
		(0.05)			(0.05)
Social capital			0.04		0.04
			(0.04)		(0.04)
HH used heavy materials				0.07	0.07
				(0.06)	(0.06)
Distance to ocean				0.00	0.00
				(0.03)	(0.04)
Age	0.01*	0.01*	0.01*	0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.03	0.03	0.03	0.04	0.04
	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)
Status: single	-0.23**	-0.24**	-0.22**	-0.22**	-0.23**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)
Constant	-0.65***	-0.61***	-0.66***	-0.57**	-0.58***
	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)
Observations	445	445	445	445	445
F	1.95	1.94	1.89	1.67	1.50
R^2	0.06	0.06	0.06	0.06	0.07
Adjusted R^2	-0.02	-0.01	-0.02	-0.02	-0.02

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.18: Effect of five capital forms indices on individual perceived affectedness with control variables

	(1)	(2)	(3)	(4)	(5)
Human capital	0.01				-0.00
	(0.01)				(0.01)
Financial capital		0.01			0.01
		(0.01)			(0.01)
Social capital			0.03***		0.03***
			(0.01)		(0.01)
HH used heavy materials				-0.01	-0.01
				(0.01)	(0.01)
Distance to ocean				0.00	0.01
				(0.01)	(0.01)
Age	-0.00	-0.00	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Status: single	0.00	0.00	0.00	0.00	0.00
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Constant	0.43***	0.44***	0.42***	0.43***	0.42***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Observations	445	445	445	445	445
F	11.21	11.30	11.78	10.79	10.99
R^2	0.43	0.43	0.44	0.43	0.44
Adjusted R^2	0.38	0.38	0.39	0.38	0.39

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.19: Effect of five capital forms indices on perceived external help with control variables

	(1)	(2)	(3)	(4)	(5)
Human capital	0.00				-0.02
	(0.05)				(0.05)
Financial capital		0.05			0.06
		(0.04)			(0.05)
Social capital			0.10**		0.10**
			(0.04)		(0.05)
HH used heavy materials				-0.08*	-0.09**
				(0.04)	(0.04)
Distance to ocean				-0.07	-0.06
				(0.05)	(0.06)
Age	-0.01*	-0.01*	-0.01	-0.01	-0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.19**	0.19**	0.19**	0.18*	0.18*
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Status: single	-0.10	-0.11	-0.09	-0.10	-0.10
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Constant	0.55*	0.57**	0.51*	0.48*	0.46
	(0.28)	(0.28)	(0.28)	(0.29)	(0.29)
Observations	445	445	445	445	445
F	5.97	6.00	6.35	6.16	5.84
R^2	0.26	0.27	0.27	0.27	0.28
Adjusted R^2	0.20	0.21	0.21	0.21	0.22

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.20: Effect of five capital forms indices on perceived internal help with control variables

	(1)	(2)	(3)	(4)	(5)
Human capital	-0.02				-0.05
	(0.05)				(0.05)
Financial capital		0.10**			0.11**
		(0.05)			(0.05)
Social capital			0.09*		0.09*
			(0.05)		(0.05)
HH used heavy materials				0.00	-0.01
				(0.05)	(0.05)
Distance to ocean				-0.05	-0.05
				(0.06)	(0.06)
Age	-0.01**	-0.01***	-0.01**	-0.01**	-0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Female	0.12	0.13	0.12	0.12	0.12
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Status: single	0.15	0.13	0.16	0.15	0.14
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Constant	0.78**	0.81**	0.73**	0.77**	0.78**
	(0.32)	(0.32)	(0.32)	(0.33)	(0.33)
Observations	445	445	445	445	445
F	1.43	1.75	1.59	1.41	1.74
R^2	0.08	0.09	0.09	0.09	0.10
Adjusted R^2	0.01	0.02	0.02	0.01	0.02

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.21: Effect of five capital forms components on recovery time, controlling for vulnerable groups

	(1)	(2)	(3)	(4)	(5)
High school	-0.02				-0.02
	(0.07)				(0.06)
Vocational training	-0.05*				-0.02
	(0.03)				(0.03)
College	-0.08*				-0.05
	(0.04)				(0.05)
Conscientiousness	0.04				0.05
	(0.04)				(0.05)
Regular income		0.01			0.02
		(0.05)			(0.06)
Monthly income ($*1000PHP$)		-0.01			-0.00
		(0.03)			(0.04)
Savings$\geq 1.000PHP$		-0.08			-0.09
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		0.09			0.10
		(0.06)			(0.06)
Reduced food		0.10**			0.12**
		(0.04)			(0.05)
Trust: institutions			0.09		0.08
			(0.07)		(0.08)
Solidarity			0.02		0.04
			(0.06)		(0.06)
Trust: bonding			-0.08		-0.10
			(0.07)		(0.07)
Trust: general			0.03		0.05
			(0.05)		(0.05)
Club memberships			-0.01		-0.01
			(0.06)		(0.06)
Voluntary work			0.04		0.03
			(0.05)		(0.05)
Household size			-0.00		-0.02
			(0.04)		(0.04)
Number of friends			-0.09**		-0.09**
			(0.04)		(0.04)
Barangay kagawat			0.01		0.11
			(0.17)		(0.19)
HH used heavy materials				-0.05	-0.06
				(0.04)	(0.04)
Distance to ocean				0.04	0.04
				(0.03)	(0.04)
Age	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
Female	0.06	0.00	0.06	0.04	0.04
	(0.10)	(0.10)	(0.11)	(0.10)	(0.11)
Status: single	0.01	0.05	0.02	0.02	0.04
	(0.11)	(0.10)	(0.11)	(0.11)	(0.10)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.33	-0.35	-0.36	-0.40	-0.36
	(0.26)	(0.26)	(0.29)	(0.26)	(0.26)
Observations	433	433	433	430	430
F	1.97	1.81	1.74	2.14	1.25
R^2	0.16	0.18	0.17	0.16	0.21
Adjusted R^2	0.08	0.10	0.08	0.08	0.10

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.22: Effect of five capital forms components on recovery costs, controlling for vulnerable groups

	(1)	(2)	(3)	(4)	(5)
High school	0.00				0.01
	(0.07)				(0.06)
Vocational training	0.04				0.04
	(0.05)				(0.05)
College	0.00				0.00
	(0.05)				(0.05)
Conscientiousness	0.04				0.03
	(0.05)				(0.05)
Regular income		-0.03			-0.01
		(0.05)			(0.05)
Monthly income ($*1000PHP$)		0.01			0.01
		(0.05)			(0.05)
Savings$\geq 1.000PHP$		0.04			0.03
		(0.04)			(0.05)
Debt$\geq 5.000PHP$		0.08			0.08
		(0.05)			(0.05)
Reduced food		-0.01			-0.00
		(0.05)			(0.06)
Trust: institutions			0.02		0.03
			(0.04)		(0.05)
Solidarity			0.04		0.03
			(0.07)		(0.07)
Trust: bonding			-0.01		-0.01
			(0.05)		(0.05)
Trust: general			0.06		0.05
			(0.06)		(0.06)
Club memberships			-0.02		-0.04
			(0.05)		(0.05)
Voluntary work			0.00		0.00
			(0.03)		(0.03)
Household size			0.01		0.01
			(0.04)		(0.04)
Number of friends			-0.03		-0.03
			(0.03)		(0.03)
Barangay kagawat			0.05		-0.01
			(0.17)		(0.17)
HH used heavy materials				0.04	0.01
				(0.05)	(0.04)
Distance to ocean				0.01	0.02
				(0.01)	(0.02)
Age	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Female	0.03	0.01	0.05	0.03	0.04
	(0.10)	(0.10)	(0.11)	(0.10)	(0.11)
Status: single	-0.13	-0.10	-0.09	-0.12	-0.09
	(0.13)	(0.12)	(0.12)	(0.13)	(0.12)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.27	0.35	0.27	0.31	0.29
	(0.38)	(0.40)	(0.40)	(0.39)	(0.38)
Observations	444	444	444	444	444
F	5.32	4.96	4.60	5.49	3.84
R^2	0.26	0.27	0.26	0.26	0.27
Adjusted R^2	0.19	0.20	0.19	0.20	0.18

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.23: Effect of five capital forms components on time individuals had to prepare for impact, controlling for vulnerable groups

	(1)	(2)	(3)	(4)	(5)
High school	-0.02				-0.03
	(0.06)				(0.06)
Vocational training	-0.01				-0.04
	(0.04)				(0.05)
College	0.04				0.01
	(0.06)				(0.06)
Conscientiousness	0.04				0.03
	(0.05)				(0.05)
Regular income		0.04			0.04
		(0.06)			(0.06)
Monthly income ($*1000PHP$)		0.11*			0.11
		(0.07)			(0.07)
Savings$\geq 1.000PHP$		-0.06			-0.07
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		0.05			0.04
		(0.06)			(0.06)
Reduced food		-0.02			-0.02
		(0.04)			(0.05)
Trust: institutions			0.00		0.01
			(0.06)		(0.06)
Solidarity			0.02		0.01
			(0.06)		(0.06)
Trust: bonding			0.02		0.01
			(0.06)		(0.06)
Trust: general			0.03		0.03
			(0.05)		(0.05)
Club memberships			-0.02		-0.05
			(0.05)		(0.05)
Voluntary work			0.06		0.06
			(0.05)		(0.05)
Household size			-0.01		-0.02
			(0.05)		(0.05)
Number of friends			-0.01		-0.01
			(0.03)		(0.04)
Barangay kagawat			0.13		0.04
			(0.16)		(0.20)
HH used heavy materials				0.07	0.06
				(0.06)	(0.07)
Distance to ocean				0.00	0.00
				(0.03)	(0.04)
Age	0.01*	0.01	0.01	0.01	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.02	0.00	0.06	0.04	0.05
	(0.11)	(0.11)	(0.12)	(0.12)	(0.11)
Status: single	-0.23**	-0.21**	-0.24**	-0.22**	-0.22**
	(0.10)	(0.09)	(0.09)	(0.09)	(0.10)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.64***	-0.50**	-0.60***	-0.57**	-0.48**
	(0.23)	(0.21)	(0.22)	(0.22)	(0.23)
Observations	445	445	445	445	445
F	1.58	1.98	1.51	1.67	1.16
R^2	0.06	0.07	0.06	0.06	0.08
Adjusted R^2	-0.02	-0.01	-0.03	-0.02	-0.04

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.24: Effect of five capital forms components on individual perceived affectedness, controlling for vulnerable groups

	(1)	(2)	(3)	(4)	(5)
High school	-0.02				-0.03
	(0.05)				(0.05)
Vocational training	0.02				0.04
	(0.04)				(0.04)
College	0.03				0.04
	(0.04)				(0.05)
Conscientiousness	0.02				-0.01
	(0.04)				(0.04)
Regular income		0.00			-0.03
		(0.04)			(0.04)
Monthly income ($*1000PHP$)		-0.06			-0.09**
		(0.04)			(0.04)
Savings≥ $1.000PHP$		0.04			0.06
		(0.04)			(0.04)
Debt≥ $5.000PHP$		0.03			0.02
		(0.04)			(0.05)
Reduced food		-0.03			-0.02
		(0.04)			(0.04)
Trust: institutions			0.07		0.07*
			(0.04)		(0.04)
Solidarity			-0.05		-0.06
			(0.04)		(0.04)
Trust: bonding			0.04		0.04
			(0.04)		(0.04)
Trust: general			-0.01		-0.02
			(0.04)		(0.04)
Club memberships			0.06		0.07
			(0.05)		(0.05)
Voluntary work			0.06*		0.06*
			(0.03)		(0.03)
Household size			0.03		0.04
			(0.04)		(0.04)
Number of friends			0.00		0.01
			(0.02)		(0.02)
Barangay kagawat			0.00		0.01
			(0.12)		(0.14)
HH used heavy materials				-0.02	-0.02
				(0.04)	(0.04)
Distance to ocean				-0.02	0.00
				(0.05)	(0.06)
Age	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.01	-0.02	-0.05	-0.01	-0.06
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Status: single	0.04	0.03	0.04	0.05	0.02
	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.21	0.20	0.23	0.18	0.22
	(0.30)	(0.29)	(0.30)	(0.29)	(0.32)
Observations	445	445	445	445	445
F	11.53	10.88	10.55	11.43	9.30
R^2	0.42	0.42	0.43	0.41	0.44
Adjusted R^2	0.37	0.37	0.38	0.37	0.37

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.25: Effect of five capital forms components on perceived external help, controlling for vulnerable groups

	(1)	(2)	(3)	(4)	(5)
High school	0.09*				0.10*
	(0.05)				(0.05)
Vocational training	0.06				0.07
	(0.05)				(0.05)
College	0.11*				0.12*
	(0.06)				(0.06)
Conscientiousness	0.03				0.01
	(0.05)				(0.05)
Regular income		-0.00			-0.03
		(0.05)			(0.05)
Monthly income ($*1000PHP$)		-0.00			-0.02
		(0.04)			(0.04)
Savings$\geq 1.000PHP$		0.02			0.03
		(0.05)			(0.05)
Debt$\geq 5.000PHP$		0.02			0.03
		(0.05)			(0.05)
Reduced food		-0.05			-0.04
		(0.05)			(0.05)
Trust: institutions			0.07		0.06
			(0.05)		(0.05)
Solidarity			-0.06		-0.05
			(0.05)		(0.05)
Trust: bonding			0.05		0.06
			(0.05)		(0.05)
Trust: general			-0.03		-0.02
			(0.04)		(0.04)
Club memberships			0.03		0.01
			(0.05)		(0.05)
Voluntary work			-0.02		-0.03
			(0.05)		(0.05)
Household size			0.01		0.02
			(0.04)		(0.05)
Number of friends			0.03		0.03
			(0.02)		(0.03)
Barangay kagawat			0.14		0.13
			(0.15)		(0.16)
HH used heavy materials				-0.08*	-0.10**
				(0.04)	(0.05)
Distance to ocean				-0.07	-0.04
				(0.05)	(0.06)
Age	-0.01	-0.01*	-0.01*	-0.01	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.17*	0.19*	0.15	0.18*	0.13
	(0.10)	(0.10)	(0.10)	(0.09)	(0.10)
Status: single	-0.09	-0.11	-0.11	-0.10	-0.08
	(0.13)	(0.14)	(0.14)	(0.13)	(0.14)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.42	0.59**	0.51*	0.48*	0.28
	(0.29)	(0.29)	(0.29)	(0.29)	(0.33)
Observations	445	445	445	445	445
F	5.96	5.59	5.73	6.16	5.30
R^2	0.27	0.27	0.28	0.27	0.30
Adjusted R^2	0.21	0.20	0.21	0.21	0.21

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.26: Effect of five capital forms components on perceived internal help

	(1)	(2)	(3)	(4)	(5)
High school	0.05				0.06
	(0.06)				(0.07)
Vocational training	0.00				0.01
	(0.05)				(0.06)
College	0.04				0.03
	(0.06)				(0.06)
Conscientiousness	0.04				0.01
	(0.05)				(0.05)
Regular income		0.04			0.05
		(0.05)			(0.05)
Monthly income ($*1000PHP$)		-0.03			-0.05
		(0.05)			(0.05)
Savings$\geq 1.000PHP$		0.12**			0.13**
		(0.06)			(0.05)
Debt$\geq 5.000PHP$		0.00			-0.01
		(0.05)			(0.05)
Reduced food		-0.02			-0.03
		(0.06)			(0.06)
Trust: institutions			-0.01		-0.00
			(0.06)		(0.05)
Solidarity			0.02		0.01
			(0.06)		(0.06)
Trust: bonding			0.11**		0.12**
			(0.05)		(0.05)
Trust: general			-0.02		-0.04
			(0.05)		(0.05)
Club memberships			0.09*		0.07
			(0.05)		(0.06)
Voluntary work			-0.01		-0.01
			(0.04)		(0.04)
Household size			0.03		0.04
			(0.05)		(0.06)
Number of friends			-0.07**		-0.07**
			(0.03)		(0.03)
Barangay kagawat			-0.15		-0.24
			(0.16)		(0.16)
HH used heavy materials				0.00	0.01
				(0.05)	(0.06)
Distance to ocean				-0.05	-0.04
				(0.06)	(0.06)
Age	-0.01**	-0.01**	-0.01**	-0.01**	-0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Female	0.12	0.14	0.07	0.12	0.09
	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)
Status: single	0.16	0.12	0.16	0.15	0.14
	(0.15)	(0.15)	(0.15)	(0.15)	(0.16)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.69**	0.75**	0.86**	0.77**	0.71*
	(0.34)	(0.33)	(0.34)	(0.33)	(0.37)
Observations	445	445	445	445	445
F	1.42	1.69	1.68	1.41	1.75
R^2	0.09	0.10	0.11	0.09	0.13
Adjusted R^2	0.01	0.02	0.02	0.01	0.01

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.27: Effect of five capital forms indices on recovery time - high intensity only

	(1)	(2)	(3)	(4)	(5)
Human capital	0.07				0.06
	(0.12)				(0.12)
Financial capital		-0.21**			-0.21**
		(0.08)			(0.09)
Social capital			0.10		0.09
			(0.13)		(0.12)
HH used heavy materials				-0.06	-0.05
				(0.08)	(0.08)
Distance to ocean				1.74*	1.72*
				(1.00)	(0.92)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.25***	-0.26***	-0.23***	0.18	0.08
	(0.07)	(0.06)	(0.06)	(0.24)	(0.25)
Observations	205	205	205	205	205
F	2.22	1.99	2.16	1.84	1.46
R^2	0.07	0.09	0.07	0.12	0.14
Adjusted R^2	0.00	0.02	0.01	0.05	0.06

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.28: Effect of five capital forms indices on recovery costs - high intensity only

	(1)	(2)	(3)	(4)	(5)
Human capital	0.10				0.07
	(0.13)				(0.12)
Financial capital		0.10			0.09
		(0.14)			(0.14)
Social capital			0.08		0.06
			(0.09)		(0.09)
HH used heavy materials				0.11	0.10
				(0.10)	(0.10)
Distance to ocean				-0.08	-0.10
				(0.34)	(0.34)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.39	0.46	0.42	0.42	0.38
	(0.35)	(0.34)	(0.35)	(0.35)	(0.35)
Observations	220	220	220	220	220
F	3.04	3.03	3.15	2.82	2.35
R^2	0.13	0.13	0.13	0.13	0.14
Adjusted R^2	0.07	0.07	0.07	0.07	0.06

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.29: Effect of five capital forms indices on time until impact - high inensity only

	(1)	(2)	(3)	(4)	(5)
Human capital	-0.06				-0.07
	(0.08)				(0.08)
Financial capital		0.07			0.07
		(0.08)			(0.08)
Social capital			0.02		0.04
			(0.06)		(0.06)
HH used heavy materials				0.07	0.06
				(0.10)	(0.10)
Distance to ocean				-0.25*	-0.25*
				(0.14)	(0.15)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.28***	-0.30***	-0.32***	-0.37***	-0.33***
	(0.11)	(0.10)	(0.10)	(0.09)	(0.11)
Observations	221	221	221	221	221
F	1.06	0.99	1.05	0.86	0.72
R^2	0.04	0.04	0.03	0.04	0.05
Adjusted R^2	-0.03	-0.03	-0.03	-0.03	-0.04

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.30: Effect of five capital forms indices on individual perceived affectedness - high intensity only

	(1)	(2)	(3)	(4)	(5)
Human capital	0.03				0.01
	(0.02)				(0.02)
Financial capital		0.02			0.02
		(0.02)			(0.02)
Social capital			0.05***		0.05***
			(0.02)		(0.02)
HH used heavy materials				-0.02	-0.02
				(0.02)	(0.02)
Distance to ocean				-0.01	-0.03
				(0.07)	(0.08)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.41***	0.43***	0.41***	0.42***	0.41***
	(0.07)	(0.06)	(0.06)	(0.07)	(0.07)
Observations	221	221	221	221	221
F	5.79	6.43	7.23	5.22	6.97
R^2	0.27	0.26	0.29	0.26	0.30
Adjusted R^2	0.22	0.21	0.24	0.21	0.23

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.31: Effect of five capital forms indices on perceived external help - high intensity only

	(1)	(2)	(3)	(4)	(5)
Human capital	-0.05				-0.10
	(0.08)				(0.08)
Financial capital		0.10			0.12*
		(0.07)			(0.07)
Social capital			0.10		0.12*
			(0.06)		(0.07)
HH used heavy materials				-0.08	-0.09
				(0.06)	(0.06)
Distance to ocean				0.14	0.12
				(0.47)	(0.52)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.35	0.35	0.30	0.36	0.40
	(0.21)	(0.21)	(0.21)	(0.24)	(0.25)
Observations	221	221	221	221	221
F	3.46	3.70	3.73	3.44	3.58
R^2	0.18	0.19	0.19	0.18	0.21
Adjusted R^2	0.12	0.13	0.13	0.12	0.14

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.32: Effect of five capital forms indices on perceived help by friends and neighbors - high intensity only

	(1)	(2)	(3)	(4)	(5)
Human capital	-0.11				-0.15*
	(0.08)				(0.09)
Financial capital		0.15*			0.16**
		(0.08)			(0.08)
Social capital			0.02		0.05
			(0.06)		(0.07)
HH used heavy materials				-0.03	-0.04
				(0.07)	(0.07)
Distance to ocean				0.29	0.29
				(0.31)	(0.31)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.38*	0.35	0.32	0.39*	0.49**
	(0.22)	(0.22)	(0.22)	(0.22)	(0.23)
Observations	221	221	221	221	221
F	1.38	1.62	1.07	1.04	1.65
R^2	0.07	0.08	0.06	0.06	0.09
Adjusted R^2	0.00	0.01	-0.00	-0.01	0.01

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.33: Effect of five capital forms components on recovery time - high intensity only

	(1)	(2)	(3)	(4)	(5)
High school	-0.05				0.04
	(0.12)				(0.12)
Vocational training	-0.16**				-0.01
	(0.06)				(0.08)
College	-0.20**				-0.15
	(0.10)				(0.11)
Conscientiousness	0.07				0.07
	(0.11)				(0.14)
Regular income		0.03			0.06
		(0.13)			(0.14)
Monthly income ($*1000PHP$)		-0.04			-0.03
		(0.09)			(0.08)
Savings$\geq 1.000PHP$		-0.12			-0.16
		(0.09)			(0.10)
Debt$\geq 5.000PHP$		0.20			0.19
		(0.12)			(0.12)
Reduced food		0.24**			0.26**
		(0.11)			(0.12)
Trust: institutions			0.18		0.17
			(0.14)		(0.14)
Solidarity			0.06		0.14
			(0.12)		(0.12)
Trust: bonding			-0.18		-0.19
			(0.14)		(0.14)
Trust: general			0.07		0.13
			(0.10)		(0.10)
Club memberships			0.03		-0.01
			(0.11)		(0.12)
Voluntary work			0.16		0.18
			(0.22)		(0.23)
Household size			0.03		-0.02
			(0.09)		(0.08)
Number of friends			-0.10*		-0.12**
			(0.05)		(0.06)
HH used heavy materials				-0.06	-0.08
				(0.08)	(0.07)
Distance to ocean				1.74*	1.60
				(1.00)	(0.99)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.19*	-0.34***	-0.22**	0.18	0.04
	(0.10)	(0.10)	(0.10)	(0.24)	(0.31)
Observations	205	205	205	205	205
F	1.70	1.46	1.35	1.84	1.03
R^2	0.09	0.12	0.11	0.12	0.23
Adjusted R^2	0.00	0.04	0.00	0.05	0.09

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.34: Effect of five capital forms components on recovery costs - high intensity only

	(1)	(2)	(3)	(4)	(5)
High school	-0.02				0.01
	(0.12)				(0.10)
Vocational training	0.20				0.22
	(0.18)				(0.17)
College	0.00				-0.02
	(0.11)				(0.13)
Conscientiousness	0.08				0.10
	(0.12)				(0.12)
Regular income		-0.06			-0.00
		(0.10)			(0.12)
Monthly income ($*1000PHP$)		0.06			0.05
		(0.14)			(0.14)
Savings$\geq 1.000PHP$		0.04			0.05
		(0.08)			(0.08)
Debt$\geq 5.000PHP$		0.18*			0.19*
		(0.10)			(0.10)
Reduced food		-0.03			-0.00
		(0.13)			(0.14)
Trust: institutions			0.04		0.07
			(0.08)		(0.09)
Solidarity			0.10		0.10
			(0.14)		(0.15)
Trust: bonding			-0.05		-0.10
			(0.09)		(0.08)
Trust: general			0.13		0.09
			(0.12)		(0.13)
Club memberships			-0.01		-0.04
			(0.09)		(0.09)
Voluntary work			-0.01		-0.06
			(0.10)		(0.09)
Household size			0.06		0.07
			(0.08)		(0.09)
Number of friends			-0.03		-0.01
			(0.04)		(0.04)
Barangay kagawat			0.10		-0.11
			(0.29)		(0.29)
HH used heavy materials				0.11	0.07
				(0.10)	(0.09)
Distance to ocean				-0.08	0.01
				(0.34)	(0.38)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.41	0.49	0.48	0.42	0.47
	(0.37)	(0.34)	(0.34)	(0.35)	(0.37)
Observations	220	220	220	220	220
F	2.60	2.66	2.33	2.82	1.77
R^2	0.14	0.15	0.14	0.13	0.18
Adjusted R^2	0.07	0.07	0.05	0.07	0.04

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.35: Effect of five capital forms components on time individuals had to prepare for impact - high intensity only

	(1)	(2)	(3)	(4)	(5)
High school	-0.01				-0.01
	(0.09)				(0.09)
Vocational training	0.01				-0.01
	(0.04)				(0.05)
College	0.06				0.02
	(0.12)				(0.11)
Conscientiousness	-0.02				-0.05
	(0.07)				(0.07)
Regular income		0.04			0.04
		(0.10)			(0.13)
Monthly income ($*1000PHP$)		0.08			0.07
		(0.09)			(0.09)
Savings$\geq 1.000PHP$		-0.06			-0.06
		(0.07)			(0.07)
Debt$\geq 5.000PHP$		0.06			0.05
		(0.09)			(0.10)
Reduced food		-0.08			-0.08
		(0.07)			(0.07)
Trust: institutions			0.02		0.02
			(0.10)		(0.09)
Solidarity			0.04		0.04
			(0.09)		(0.10)
Trust: bonding			-0.06		-0.05
			(0.10)		(0.10)
Trust: general			0.07		0.07
			(0.08)		(0.10)
Club memberships			0.05		0.02
			(0.08)		(0.07)
Voluntary work			0.10		0.09
			(0.11)		(0.11)
Household size			0.05		0.06
			(0.08)		(0.08)
Number of friends			0.02		0.02
			(0.05)		(0.06)
Barangay kagawat			0.13		0.08
			(0.22)		(0.32)
HH used heavy materials				0.07	0.03
				(0.10)	(0.12)
Distance to ocean				-0.25*	-0.19
				(0.14)	(0.22)
Village fixed effects	yes	yes	yes	yes	yes
Constant	-0.31**	-0.27***	-0.30**	-0.37***	-0.28*
	(0.12)	(0.10)	(0.13)	(0.09)	(0.16)
Observations	221	221	221	221	221
F	0.77	0.78	0.69	0.86	0.50
R^2	0.04	0.05	0.05	0.04	0.06
Adjusted R^2	-0.04	-0.04	-0.06	-0.03	-0.10

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.36: Effect of five capital forms components on individual perceived affectedness

	(1)	(2)	(3)	(4)	(5)
High school	-0.01				-0.01
	(0.07)				(0.07)
Vocational training	0.07				0.03
	(0.07)				(0.08)
College	-0.01				0.00
	(0.07)				(0.07)
Conscientiousness	0.04				-0.01
	(0.07)				(0.07)
Regular income		-0.04			-0.08
		(0.07)			(0.07)
Monthly income ($*1000PHP$)		-0.02			-0.02
		(0.07)			(0.08)
Savings$\geq 1.000PHP$		0.02			0.04
		(0.06)			(0.07)
Debt$\geq 5.000PHP$		-0.01			-0.00
		(0.06)			(0.07)
Reduced food		-0.11			-0.11
		(0.08)			(0.08)
Trust: institutions			0.12*		0.11
			(0.07)		(0.07)
Solidarity			-0.05		-0.05
			(0.07)		(0.08)
Trust: bonding			0.07		0.08
			(0.07)		(0.07)
Trust: general			-0.06		-0.06
			(0.06)		(0.07)
Club memberships			-0.01		0.00
			(0.07)		(0.08)
Voluntary work			0.14*		0.13*
			(0.08)		(0.08)
Household size			0.02		0.05
			(0.07)		(0.07)
Number of friends			0.01		0.02
			(0.02)		(0.03)
Barangay kagawat			0.01		0.05
			(0.19)		(0.22)
HH used heavy materials				-0.05	-0.05
				(0.06)	(0.07)
Distance to ocean				0.18	0.19
				(0.29)	(0.35)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.10	0.18	0.03	0.16	0.15
	(0.22)	(0.22)	(0.23)	(0.23)	(0.26)
Observations	221	221	221	221	221
F	4.46	4.72	4.44	4.52	3.48
R^2	0.23	0.24	0.27	0.23	0.29
Adjusted R^2	0.17	0.17	0.19	0.17	0.16

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.37: Effect of five capital forms components on perceived external help - high intensity only

	(1)	(2)	(3)	(4)	(5)
High school	0.13*				0.12
	(0.07)				(0.07)
Vocational training	0.10				0.11
	(0.10)				(0.11)
College	0.14*				0.15*
	(0.08)				(0.08)
Conscientiousness	-0.04				-0.08
	(0.08)				(0.09)
Regular income		0.02			0.00
		(0.08)			(0.09)
Monthly income ($*1000PHP$)		0.01			-0.02
		(0.08)			(0.08)
Savings$\geq 1.000PHP$		0.01			0.01
		(0.06)			(0.06)
Debt$\geq 5.000PHP$		0.05			0.07
		(0.06)			(0.07)
Reduced food		-0.13			-0.16*
		(0.08)			(0.08)
Trust: institutions			0.07		0.06
			(0.06)		(0.06)
Solidarity			-0.03		-0.02
			(0.08)		(0.07)
Trust: bonding			0.02		0.05
			(0.07)		(0.07)
Trust: general			0.00		0.01
			(0.07)		(0.07)
Club memberships			0.11		0.09
			(0.07)		(0.08)
Voluntary work			-0.08		-0.09
			(0.09)		(0.09)
Household size			0.01		0.04
			(0.07)		(0.07)
Number of friends			0.03		0.04
			(0.02)		(0.03)
Barangay kagawat			0.02		0.04
			(0.21)		(0.25)
HH used heavy materials				-0.08	-0.12*
				(0.06)	(0.07)
Distance to ocean				0.14	0.14
				(0.47)	(0.52)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.27	0.39*	0.29	0.36	0.36
	(0.22)	(0.22)	(0.23)	(0.24)	(0.27)
Observations	221	221	221	221	221
F	3.52	2.96	2.71	3.44	2.88
R^2	0.19	0.19	0.20	0.18	0.25
Adjusted R^2	0.13	0.12	0.11	0.12	0.11

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.38: Effect of five capital forms components on perceived internal help - high intensity only

	(1)	(2)	(3)	(4)	(5)
High school	0.12				0.13
	(0.08)				(0.09)
Vocational training	0.08				0.14
	(0.12)				(0.14)
College	0.02				0.02
	(0.08)				(0.09)
Conscientiousness	-0.05				-0.08
	(0.08)				(0.09)
Regular income		0.04			0.08
		(0.09)			(0.09)
Monthly income ($*1000PHP$)		-0.02			-0.03
		(0.08)			(0.08)
Savings$\geq 1.000PHP$		0.10			0.11
		(0.07)			(0.07)
Debt$\geq 5.000PHP$		0.06			0.08
		(0.07)			(0.07)
Reduced food		-0.06			-0.06
		(0.09)			(0.09)
Trust: institutions			-0.06		-0.04
			(0.08)		(0.07)
Solidarity			0.07		0.08
			(0.08)		(0.09)
Trust: bonding			0.09		0.10
			(0.08)		(0.08)
Trust: general			-0.04		-0.03
			(0.08)		(0.08)
Club memberships			0.13		0.10
			(0.08)		(0.09)
Voluntary work			-0.03		-0.04
			(0.10)		(0.09)
Household size			-0.02		0.01
			(0.08)		(0.08)
Number of friends			-0.06*		-0.07**
			(0.03)		(0.03)
Barangay kagawat			-0.36*		-0.51**
			(0.22)		(0.24)
HH used heavy materials				-0.03	-0.03
				(0.07)	(0.08)
Distance to ocean				0.29	0.24
				(0.31)	(0.34)
Village fixed effects	yes	yes	yes	yes	yes
Constant	0.29	0.35	0.51**	0.39*	0.58**
	(0.22)	(0.22)	(0.25)	(0.22)	(0.26)
Observations	221	221	221	221	221
F	1.18	1.41	1.42	1.04	1.78
R^2	0.07	0.08	0.10	0.06	0.15
Adjusted R^2	-0.01	0.00	0.00	-0.01	0.00

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.39: Effect of different combinations of capital endowment on performance in resilience, baseline=cluster 2

	(1) Time of repairs	(2) Costs of repairs	(3) Time until impact	(4) Perceived affected-ness	(5) Perceived external help	(6) Perceived internal help
Cluster 1	-29.57	-219.58	0.13	-0.05*	-0.01	0.01
	(18.49)	(1706.79)	(1.43)	(0.03)	(0.02)	(0.03)
Cluster 3	-54.83***	2242.15	1.83	-0.04	0.02	0.04
	(19.45)	(2704.31)	(2.05)	(0.03)	(0.03)	(0.04)
Distance to ocean	6.88	128.65	0.05	0.01	-0.02	-0.01
	(4.97)	(220.67)	(0.45)	(0.01)	(0.01)	(0.02)
HH used heavy materials	-5.67	718.56	0.94	-0.01	-0.03***	-0.01
	(5.53)	(769.62)	(0.76)	(0.01)	(0.01)	(0.01)
Village fixed effects	yes	yes	yes	yes	yes	yes
Constant	29.61***	13879.37***	3.33**	0.44***	0.38***	0.36***
	(10.66)	(5301.09)	(1.30)	(0.07)	(0.06)	(0.06)
Observations	411	425	426	426	426	426
F	1.80	5.17	1.48	10.77	6.65	1.26
R^2	0.17	0.26	0.05	0.43	0.28	0.07
Adjusted R^2	0.10	0.19	-0.03	0.38	0.22	-0.00

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.40: Effect of different combinations of capital endowment on performance in resilience, baseline=cluster 3

	(1) Time of repairs	(2) Costs of repairs	(3) Time until impact	(4) Perceived affected-ness	(5) Perceived external help	(6) Perceived internal help
Cluster 1	25.27*	-2461.74	-1.70	-0.01	-0.03	-0.03
	(13.75)	(2314.86)	(2.05)	(0.03)	(0.03)	(0.04)
Cluster 2	54.83***	-2242.15	-1.83	0.04	-0.02	-0.04
	(19.45)	(2704.31)	(2.05)	(0.03)	(0.03)	(0.04)
Distance to ocean	6.88	128.65	0.05	0.01	-0.02	-0.01
	(4.97)	(220.67)	(0.45)	(0.01)	(0.01)	(0.02)
HH used heavy materials	-5.67	718.56	0.94	-0.01	-0.03***	-0.01
	(5.53)	(769.62)	(0.76)	(0.01)	(0.01)	(0.01)
Village fixed effects	yes	yes	yes	yes	yes	yes
Constant	-25.23	16121.52**	5.17**	0.40***	0.40***	0.40***
	(16.39)	(6312.67)	(2.13)	(0.07)	(0.06)	(0.06)
Observations	411	425	426	426	426	426
F	1.80	5.17	1.48	10.77	6.65	1.26
R^2	0.17	0.26	0.05	0.43	0.28	0.07
Adjusted R^2	0.10	0.19	-0.03	0.38	0.22	-0.00

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.41: Effect of intensity capital indicator components, fixed effects regression

	(1) Δ Conscientiousness	(2) Δ Receives regular income	(3) Δ Household income	(4) Δ Savings $\geq 1{,}000PHP$	(5) Δ Debt $\geq 5{,}000PHP$	(6) Δ Reduction of food intake	(7) Δ Institutional trust	(8) Δ Solidarity	(9) Δ Trust in bonding ties	(10) Δ Generalized trust	(11) Δ Number of club-memberships	(12) Δ Voluntary work	(13) Δ Household size	(14) Δ Number of friends
Year (2016=1)	0.06***	0.14***	1.76***	0.13***	0.13***	-0.05	-0.05***	-0.01	-0.01	-0.26***	0.07	-0.40	0.07	0.01
	(0.02)	(0.03)	(0.35)	(0.03)	(0.03)	(0.05)	(0.02)	(0.03)	(0.02)	(0.04)	(0.07)	(0.63)	(0.25)	(0.12)
(year)*(high intensity)	-0.09***	0.05	0.05	-0.05	-0.14**	-0.14*	0.01	-0.01	0.02	0.16***	-0.13	0.64	0.02	-0.25
	(0.02)	(0.05)	(0.50)	(0.04)	(0.06)	(0.07)	(0.02)	(0.05)	(0.03)	(0.05)	(0.10)	(0.70)	(0.28)	(0.38)
Constant	0.78***	0.23***	3.82***	0.17***	0.33***	0.65***	0.64***	0.46***	0.60***	0.30***	0.51***	2.40***	5.08***	2.79***
	(0.01)	(0.01)	(0.13)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.18)	(0.07)	(0.10)
Observations	895	898	898	898	898	898	888	897	892	895	898	898	898	891
F	8.86	18.95	25.02	11.16	8.72	7.73	9.53	0.08	0.24	27.50	0.86	0.52	0.35	0.23
R^2	0.05	0.07	0.10	0.05	0.02	0.05	0.05	0.00	0.00	0.13	0.01	0.00	0.00	0.00
Adjusted R^2	0.05	0.07	0.10	0.04	0.02	0.05	0.05	-0.00	-0.00	0.13	0.00	-0.00	-0.00	-0.00

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A2.42: Effect of intensity on changes in solidarity and in-group behavior including standard control variables

	(1) Δsolidarity	(2) Δtransfer anonymous (1)	(3) Δtransfer friend (1)	(4) Δingroup bias (1)	(5) Δtransfer anonymous (2)	(6) Δtransfer friend (2)	(7) Δingroup bias (2)
High intensity	-0.04	-2.11	-2.14	0.05	-3.51	-3.51	-0.10
	(0.03)	(2.28)	(2.69)	(1.59)	(2.58)	(2.57)	(1.59)
Baseline¶	-0.87***	-0.89***	-0.91***	-0.89***	-0.91***	-0.86***	-1.00***
	(0.07)	(0.05)	(0.05)	(0.06)	(0.06)	(0.07)	(0.06)
Age	0.00	0.07	0.22**	0.15*	0.04	0.04	0.01
	(0.00)	(0.10)	(0.10)	(0.08)	(0.10)	(0.12)	(0.06)
Female	-0.00	-1.06	2.28	3.40*	-0.74	-1.32	-0.63
	(0.03)	(2.11)	(2.91)	(2.00)	(2.49)	(2.69)	(1.35)
High school	0.02	2.12	0.62	-1.52	1.26	2.05	0.94
	(0.02)	(1.98)	(1.90)	(1.55)	(2.09)	(2.49)	(1.89)
Vocational training	-0.02	-0.31	-3.98	-3.79*	-0.69	0.56	1.47
	(0.04)	(3.02)	(2.96)	(1.93)	(3.73)	(4.08)	(2.30)
College	0.09**	9.64***	6.77**	-3.15	3.50	6.10*	3.22
	(0.04)	(2.76)	(2.90)	(2.39)	(3.86)	(3.31)	(2.81)
ΔHousehold income	0.00	0.01	0.01	0.00	0.21	0.19	-0.01
	(0.00)	(0.21)	(0.18)	(0.15)	(0.17)	(0.17)	(0.11)
Constant	0.34***	18.07***	19.71***	0.78	28.36***	28.58***	1.46
	(0.08)	(5.93)	(5.69)	(4.46)	(6.11)	(7.23)	(3.02)
Observations	447	448	448	448	447	447	447
F	26.18	40.92	52.59	30.75	41.68	23.23	43.36
R^2	0.38	0.44	0.39	0.41	0.41	0.37	0.35
Adjusted R^2	0.37	0.43	0.38	0.40	0.40	0.36	0.33

Robust standard errors in parentheses, clustered on village level;
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$
¶ for simplicity, coefficients for baseline values were put into the same row.

Table A2.43: Effect of intensity on changes in solidarity and in-group behavior - Fixed effects regression, balanced panel

	(1) solidarity	(2) transfer - anonymous (1)	(3) transfer - friend (1)	(4) ingroup bias (1)	(5) transfer - anonymous (2)	(6) transfer - friend (2)	(7) ingroup bias (2)
Year (2016=1)	-0.01	-4.91*	1.49	6.40***	0.88	-0.18	-1.06
	(0.03)	(2.49)	(2.54)	(1.65)	(2.12)	(1.79)	(1.56)
(year)*(high intensity)	-0.01	0.43	0.27	-0.16	-0.88	-1.05	-0.16
	(0.05)	(3.45)	(3.66)	(2.07)	(3.88)	(3.85)	(1.93)
Constant	0.46***	29.80***	32.03***	2.23***	31.77***	35.18***	3.41***
	(0.01)	(0.86)	(0.92)	(0.52)	(0.96)	(0.95)	(0.48)
Observations	897	898	898	898	897	897	897
F	0.08	3.71	0.40	20.15	0.09	0.07	0.80
R^2	0.00	0.03	0.00	0.08	0.00	0.00	0.00
Adjusted R^2	-0.00	0.03	0.00	0.08	-0.00	-0.00	0.00

Robust standard errors in parentheses, clustered on village level;
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A2.44: Effect of intensity on changes in solidarity and in-group behavior - Fixed effects regression, unbalanced panel

	(1) solidarity	(2) transfer - anonymous (1)	(3) transfer - friend (1)	(4) ingroup bias (1)	(5) transfer - anonymous (2)	(6) transfer - friend (2)	(7) ingroup bias (2)
Year (2016=1)	-0.01	-4.91*	1.49	6.40***	0.88	-0.18	-1.06
	(0.03)	(2.49)	(2.54)	(1.65)	(2.12)	(1.79)	(1.56)
(year)*(high intensity)	-0.01	0.43	0.27	-0.16	-0.88	-1.05	-0.16
	(0.05)	(3.45)	(3.66)	(2.07)	(3.88)	(3.85)	(1.93)
Constant	0.47***	30.55***	32.58***	2.03***	32.32***	35.29***	2.97***
	(0.01)	(0.88)	(0.93)	(0.53)	(0.96)	(0.94)	(0.50)
Observations	1601	1602	1602	1602	1601	1601	1601
F	0.08	3.71	0.40	20.17	0.09	0.07	0.80
R^2	0.00	0.03	0.00	0.08	0.00	0.00	0.00
Adjusted R^2	-0.00	0.03	0.00	0.08	-0.00	-0.00	0.00

Robust standard errors in parentheses, clustered on village level;
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A2.45: Effect of intensity on risk aversion - unbalanced panel, fixed effects regression

	(1) Risk aversion - incentivized	(2) Risk aversion - survey measured
Year (2016=1)	-0.08	0.15***
	(0.06)	(0.03)
(year)*(high intensity)	0.04	-0.02
	(0.08)	(0.04)
Constant	0.44***	0.34***
	(0.02)	(0.01)
Observations	1488	1601
F	1.41	24.38
R^2	0.01	0.11
Adjusted R^2	0.01	0.11

Robust standard errors in parentheses, clustered by village
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A2.46: Effect of risk aversion on self selection and effect of living in high intensity villages on risk aversion in 2016

	(1)	(2)
	Relative distance	Risk aversion - incentivized 2016
High intensity		0.04
		(0.07)
Relative risk aversion 2012	-0.01	0.01
	(0.04)	(0.05)
Constant	0.50***	0.34***
	(0.07)	(0.04)
Observations	795	388
F	0.06	0.17
R^2	0.00	0.00
Adjusted R^2	-0.00	-0.00

Robust standard errors in parentheses, clustered by village

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Materials From 2012

A3 Pre experimental survey 2012

Player number: _____

QUESTIONNAIRE BEFORE THE EXPERIMENT

Date: _____

Barangay : _____

Participant's name: _____

Interviewer name: _____

	Please fill in here
Age	
Sex (1=M, 2=F)	
Educational attainment (1=Elementary, 2=High School, 3=Vocational Training, 4=College, 5=Master's Degree)	
Household Head (1=Head, 2 = Spouse)	
Current Marital Status (1=Single, 2=Married; 3=Separated, 4=Widowed)	
How many people stay permanently (more than 6 months per year) in your household?	
Number of years living in this Barangay?	

Do you receive regular income? (0=No, 1=Yes)	
On average, how much does your household earn per month? (PhP)	
During the last year, how much did you earn on an average **good** month?	
During the last year, how much did you earn on an average **bad** month?	
In the last month, did anybody in the household reduce meals because there was not enough money for food?	
Do you have savings of more than 1000 pesos? (0=No, 1=Yes)	
Do you have savings of more than 5000 pesos? (0=No, 1=Yes)	
Do you owe money, labor or something else to somebody with a total value higher than 5000 Pesos? (0=No, 1=Yes)	
If yes, whom do you owe mainly? (1=to a bank/microfinance/money lender, 2=friend, 3=relatives, 9=other)	

Are you currently engaged in fishing? ☐ Yes ☐ No

What percentage of your income comes from fishing? _____%

Player number: _____

Please list all groups or organizations, committees, councils, associations, cooperatives to which you belong? These could be formally organized groups or just groups of people who get together regularly to do an activity or talk about things.

Name of the group:	Type of group (1=women group, 2=farmer/fisher association, 3=…)	Do you have a leading position in this group? If yes, which one?	How often per year do meetings take place?	How often per year do you go to the meetings	Do you pay membership fee? (if yes, note monthly amount)	How many hours per week do you engage in activities of this group?

How many days, in the past 3 months, have you worked with others in your community to do something for the benefit of the community? Please only think of community services that took at least half a day. _____

Did you vote in the last of the following elections:

Barangay ☐Yes ☐No

Municipal ☐Yes ☐No

Provincial ☐Yes ☐No

National ☐Yes ☐No

A4 Post experimental survey 2012

Player number: _____

QUESTIONNAIRE AFTER THE EXPERIMENT

Which sentence characterizes the behavior of the people in your barangay best? (choose one)

People are always busy and don't help so much.. ..... 1 ☐
People help first of all their family and friends when help is needed . .... 2 ☐
People help only those people they know will also help them ..... 3 ☐
People help each other whenever somebody needs help ..... 4 ☐

Don't know ..... 9 ☐

Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?

☐ Most people can be trusted.
☐ Need to be very careful.

Compared with other barangay, how much do people in this barangay trust each other in matters of lending and borrowing?

☐ More trust than in other barangay
☐ Same as in other barangay
☐ Less trust than in other barangay

About how many close friends do you have these days? These are people you feel at ease with, can talk to about private matters, or call on for help ___
Please identify your friends on the household list (this information will remain confidential):

How many of your close friends are fishermen? ___
How many of your close friends are barangay officials? ___

Apart from the people you live with, how many relatives that you feel close to live within a 15–20 minute walk, if any? _____

People react to unfair situations in very different ways. In the following I would like to ask you how you would react in unfair situations. I will now read you several statements. Please tell

me to what extent each of these statements apply to you. If you have never experienced such a situation yourself, try to imagine how you would react if you were in such a situation.

First, we will look at situations to the advantage of others and to **your own disadvantage**.

	doesn't apply at all	**applies slightly**	**applies moderately**	**applies mostly**	**applies completely**
I am upset when others are better off than me.	☐	☐	☐	☐	☐
I am upset when others are **undeservingly** better off than me.	☐	☐	☐	☐	☐
I feel good when I sacrifice for others	☐	☐	☐	☐	☐

Now, we will look at situations in which you notice or learn that **someone else** is being treated unfairly, put at a disadvantage, or used.

	doesn't apply at all	**applies slightly**	**applies moderately**	**applies mostly**	**applies completely**
I am upset when someone is undeservingly worse off than others.	☐	☐	☐	☐	☐
I feel pity when someone is undeservingly worse off than others.	☐	☐	☐	☐	☐

Now, we will look at situations that turn out **to your advantage** and to the disadvantage of others.

	doesn't apply at all	**applies slightly**	**applies moderately**	**applies mostly**	**applies completely**
I feel guilty when I am better off than others.	☐	☐	☐	☐	☐
I feel guilty when I am **undeservingly** better off than others.	☐	☐	☐	☐	☐

Finally, we look at situations in which **you** treat someone else unfairly, discriminate against someone or exploit them.

	doesn't apply at all	**applies slightly**	**applies moderately**	**applies mostly**	**applies completely**
I feel guilty when I enrich myself at the cost of others.	☐	☐	☐	☐	☐
I feel clever when I use tricks to achieve something while others have to struggle for it	☐	☐	☐	☐	☐

Player number: _____

There are many different organizations or group of people involved in important aspects of your life, ranging from the federal government to your neighbouring cooperatives and NGOs. In general, when thinking about each organization below, would you say you completely distrust them, completely trust them, or are you somewhere in between?

Organization:	**Completely distrust**	**Distrust**	**Neither trust nor distrust**	**Trust**	**Completely trust**	**Would you ask for advice to these groups in case you have a problem?**	
	[1]	[2]	[3]	[4]	[5]	**Yes**	**No**
National Government	☐	☐	☐	☐	☐	☐	☐
Provincial Government	☐	☐	☐	☐	☐	☐	☐
Municipal/ City government officials (LGU)	☐	☐	☐	☐	☐	☐	☐
Barangay captain	☐	☐	☐	☐	☐	☐	☐
Barangay kagawats	☐	☐	☐	☐	☐	☐	☐
People from your barangay	☐	☐	☐	☐	☐	☐	☐
Fishers from your barangay	☐	☐	☐	☐	☐	☐	☐
Fishers from the neighboring barangay	☐	☐	☐	☐	☐	☐	☐
NGOs	☐	☐	☐	☐	☐	☐	☐
Courts and judges	☐	☐	☐	☐	☐	☐	☐
FARMC	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐

Do you think that politicians on different levels are sincere when they implement projects and laws; do they ~~at least~~ try to keep their promises?

	doesn't apply at all	**applies slightly**	**applies moderately**	**applies mostly**	**applies completely**
At the national level?	☐	☐	☐	☐	☐
At the provincial level?	☐	☐	☐	☐	☐
At the municipal/city level? (LGU)	☐	☐	☐	☐	☐

Irrespective of their intentions, are politicians on different levels able to achieve their goals when they implement projects and laws?

	doesn't apply at all	**applies slightly**	**applies moderately**	**applies mostly**	**applies completely**
At the national level?	☐	☐	☐	☐	☐
At the provincial level?	☐	☐	☐	☐	☐
At the municipal/city level? (LGU)	☐	☐	☐	☐	☐

Player number: _____

		Have any of the following shocks happened to you or other household members in the last 2 years (since 2010 till today)?		Rank the three most important financial coping mechanism you used immediately after the incident happened? *1 – own money* *2 – borrow* *3 – gift (village)* *4 – gift (govt./NGO)* *5 – sell asset* *6 – insurance* *7 – consume less* *8 – other (specify)* *9 – don't know*
		yes	**no**	**Write 1,2,3,4,5,6,7,8,9**
1	Illness/accident of family member (at least visit to a doctor needed)	☐	☐	
2	Death of family member	☐	☐	
3	Bad weather conditions heavily affecting agricultural or fishing production.	☐	☐	
4	Bad weather conditions affecting your property.	☐	☐	
5	Other:_____ _____	☐	☐	

Are you covered by any insurance? *(insurance means that you pay in advance and if anything happens you receive a claim payment)*

Phil Health sponsored	☐Yes	☐No
Phil Health individual paying	☐Yes	☐No
Phil Health public/private employee	☐Yes	☐No
Other Health	☐Yes	☐No
Life Insurance	☐Yes	☐No
Social Security System (SSS)	☐Yes	☐No
Other insurance _____	☐Yes	☐No

Player number: _____

To what extend do you believe you would receive support in case of emergency by the following people/institutions on a scale from 1 to 5 (with 1 being "doesn't apply at all" and 5 being "applies completely")?

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely	Did you turn to these groups in case you needed financial support in an emergency situation?	
						Yes	No
Relatives within Barangay	☐	☐	☐	☐	☐	☐	☐
Friends within Barangay	☐	☐	☐	☐	☐	☐	☐
Fishermen within Barangay	☐	☐	☐	☐	☐	☐	☐
Neighbors	☐	☐	☐	☐	☐	☐	☐
Barangay Captain	☐	☐	☐	☐	☐	☐	☐
Barangay kagawats	☐	☐	☐	☐	☐	☐	☐
My Bank	☐	☐	☐	☐	☐	☐	☐
My insurance provider	☐	☐	☐	☐	☐	☐	☐
FARMC	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐

Do you travel outside the Barangay for work? ☐Yes ☐No

How many nights per months do you stay away from your barangay? _____

How many members of the household have migrated for work or marriage outside your barangay? _____

On how many of those who migrated can you rely in times of need? _____

Player number: _____

****** ONLY FOR 2010 KAGAWARD CANDIDATES ******

How happy were you with the number of votes you obtained in the last election

Completely dissatisfied	Mostly dissatisfied	Somewhat dissatisfied	Neither satisfied or dissatisfied	Somewhat satisfied	Mostly satisfied	Completely satisfied
□	□	□	□	□	□	□

If you are kagawat since the elections 2010, is this your first, second or third term?
_____

If you are <u>not</u> kagawat since the elections 2010. How many terms did you serve before? _____

What committee positions do/did you have in the council (if any, e.g. chairman, committees, task force, …)?

_____
_____
_____
_____
_____
_____

What did you do and how much in order to become elected?

_____
_____
_____
_____

Do you think it is personally rewarding to be kagawat?_____
Do you think it is financially rewarding to be kagawat? _____
Which political party do you belong to (if any)? _____

Player number: _____

Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to three!

- Independence
- Hard work
- Feeling of responsibility
- Imagination
- Tolerance and respect for other people
- Determination, perseverance
- Religious faith
- Help people in need
- Unselfishness
- Obedience
- Self-expression
- Thrift, saving money and things

Most important quality:	
Second most important quality	
Third most important quality	

The following statements may apply more or less to you. To what extent do you think each statement applies to you personally?

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I can rely on my own abilities in difficult situations.	☐	☐	☐	☐	☐
I am able to solve most problems on my own.	☐	☐	☐	☐	☐
Sometimes I do things impulsively that I shouldn't do.	☐	☐	☐	☐	☐
I sometimes do things to cheer myself up that I later regret.	☐	☐	☐	☐	☐
I usually think carefully before I act.	☐	☐	☐	☐	☐
I always bring to an end what I have started.	☐	☐	☐	☐	☐
I plan my schedule so that I get everything done on time.	☐	☐	☐	☐	☐
I am willing to take risks.	☐	☐	☐	☐	☐
I am happy to take chances.	☐	☐	☐	☐	☐

Player number: _____

Whether at work or in my private life: What I do is mainly determined by others.	□	□	□	□	□
Fate often gets in the way of my plans.	□	□	□	□	□
I respect the majority's wishes in groups of which I am a member	□	□	□	□	□
Without competition it is not possible to have a good society	□	□	□	□	□
I feel good when I co-operate with others	□	□	□	□	□
Most people can learn to be leaders- it's not a matter of birth.	□	□	□	□	□
Our leaders know what is best for us	□	□	□	□	□
Young people today do not have enough respect for traditional values	□	□	□	□	□
Schools should teach children to obey authority	□	□	□	□	□
I see myself as someone who is reserved	□	□	□	□	□
I see myself as someone who tends to be lazy	□	□	□	□	□
I see myself as someone who is relaxed, handles stress well	□	□	□	□	□
I see myself as someone who is outgoing, sociable	□	□	□	□	□
I see myself as someone who tends to find fault with others	□	□	□	□	□
I see myself as someone who does a thorough job	□	□	□	□	□
I see myself as someone who gets nervous easily	□	□	□	□	□
I see myself as someone who has an active imagination	□	□	□	□	□

The next question deals with optimism. Optimists are people who look to the future with confidence and who mostly expect good things to happen. How would you describe yourself? How optimistic are you in general?

Not optimistic at all	**a bit optimistic**	**Somewhat optimistic**	**Mostly optimistic**	**Completely optimistic**
□	□	□	□	□

Player number: _____

General Information about Fishing Activity

What kind of gear do people in your community currently use for fishing?

- ☐ Net / what mesh size do most people use? ___
- ☐ Spear gun
- ☐ Hook and line
- ☐ other – please specify: _____
- ☐ other – please specify: _____
- ☐ other – please specify: _____

Most of the year the income from fishing in this barangay is more or less uncertain than in other barangays on Panay?

☐ less uncertain ☐ same ☐ more uncertain

Do you currently fish in a group of people? ☐ Yes ☐ No

If yes:

do you share the catch? ☐ Yes ☐ No

do you get paid in cash? ☐ Yes ☐ No

other means of payment – (please specify): _____

how many fishers are you when you go fishing? ___

Who owns the boat, boat motor and fishing gear you currently use?

☐ Myself ☐ Another fisherman

☐ Fish buyer ☐ Cooperative

☐ Other: _____ (specify)

Do you see other the fishermen from <u>your barangay</u> rather as

- ☐ friends / or
- ☐ partners / or
- ☐ competitors?

Do you see other the fishermen from <u>neighboring barangay</u> rather as

- ☐ friends / or
- ☐ partners / or
- ☐ competitors?

Player number: _____

Are there any marine resources (certain fish species, corals, mangroves) that you think diminished in abundance over the last few years?

☐ Yes ☐ No
If yes:
Which one?

_____

Why do you think so?

_____
_____

Are there any marine resources (certain fish species, corals, mangroves) that you think have recovered over the last few years?

☐ Yes ☐ No
If yes:
Which one?

_____

Why do you think so?

_____
_____

I will read you a list of issues that may or may not affect fisheries in the area. For each, could you tell me if it is a problem, and if it is, how important is it?

Problem	**Not a problem [1]**	**Almost not a problem [2]**	**Problem [3]**	**Important problem [4]**	**Very important problem [5]**
Corruption within local government units	☐	☐	☐	☐	☐
Lack of adequate laws	☐	☐	☐	☐	☐
Lack of monitoring	☐	☐	☐	☐	☐
Lack of support for monitoring	☐	☐	☐	☐	☐
Competition with industrial fisheries	☐	☐	☐	☐	☐
Competition with recreational fisheries or tourism activities	☐	☐	☐	☐	☐
Competition with fishers from other states	☐	☐	☐	☐	☐
Too many fishermen	☐	☐	☐	☐	☐
Lack of zoning	☐	☐	☐	☐	☐
Marine pollution	☐	☐	☐	☐	☐

Lack of organization among fishermen	☐	☐	☐	☐	☐
fishermen do not define and respect rules	☐	☐	☐	☐	☐
Bad prices of fish	☐	☐	☐	☐	☐
Lack of economic alternatives	☐	☐	☐	☐	☐
Lack of technical support	☐	☐	☐	☐	☐
Disputes among fishermen	☐	☐	☐	☐	☐
Lack of togetherness between fishermen	☐	☐	☐	☐	☐
Stealing or vandalism e.g. destruction of fishing gear	☐	☐	☐	☐	☐
Violence between fishermen	☐	☐	☐	☐	☐
Banks do not give credit to invest in fishing business	☐	☐	☐	☐	☐
Uncertain catch due to bad weather	☐	☐	☐	☐	☐

In the recent years, has the level of trust between fishers in your neighborhood improved, worsened, or stayed the same?

☐Worsened ☐Stayed the same ☐ Improved

In the recent years, has the level of trust between fishers in this and the neighboring barangay improved, worsened, or stayed the same?

☐Worsened ☐Stayed the same ☐ Improved

In the recent years, has the level of trust between fishers and other community members improved, worsened, or stayed the same?

☐Worsened ☐Stayed the same ☐ Improved

Which of the following rules and regulations about fishing exist in your area?

Regulation			**Do you think this rule is good?**		**Have you been consulted regarding the creation of this rule?**		**In percent, how many fishers in your community adhere to the rules and regulations for fishing?**
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	
Areas where you are not allowed to fish at all	☐	☐	☐	☐	☐	☐	
Prohibited to use specific fishing gear like _____	☐	☐	☐	☐	☐	☐	

Prohibited to use specific fishing gear like _____	☐	☐	☐	☐	☐	☐	
Prohibited to use specific fishing gear like _____	☐	☐	☐	☐	☐	☐	
Seasonal restrictions to fish	☐	☐	☐	☐	☐	☐	
Certain species you are not allowed to fish	☐	☐	☐	☐	☐	☐	

How many times have you participated in some type of inspection and enforcement activities in the past year in the

☐ 1-5 times
☐ 6-10 times
☐ 11-20 times
☐ More than 20
☐ Never

Have you ever made a complaint about other fishermen?

☐ Yes ☐ No

Do you think that the leaders of the fishing groups can represent your interests as a fisher?

☐ Yes ☐ No

Did you change your fishing practices in the last 10 years?

☐ I did not change my fishing practices
☐ I changed my fishing practices very little
☐ I moderately changed my fishing practices
☐ I changed my fishing practices a lot

If you changed can you tell me why you did so?

_____
_____

**** NEW****

We are interested in learning more about the reasons why you would—or would not—choose to fish with another person. Imagine that a potential partner has the following characteristics—would each characteristic make you more likely to work with them, less likely to work with them, or would it make no difference?

	More likely to work together	**Less likely to work together**	**It would make no difference**
This person has resources such as fishing gear, boats, etc.	☐	☐	☐
We are from the same village.	☐	☐	☐
This person knows fishing techniques that I don't know.	☐	☐	☐

Player number: _____

This person has less experience than I do.	☐	☐	☐
We have worked well together one time before.	☐	☐	☐
Everyone I know says that this person is trustworthy.	☐	☐	☐
This is an important person in my village.	☐	☐	☐
We share the same religion.	☐	☐	☐
We had an argument in the past.	☐	☐	☐
We are cousins.	☐	☐	☐
We have different political opinions.	☐	☐	☐
A close friend says that this person is not trustworthy.	☐	☐	☐
We are related by marriage.	☐	☐	☐
This person has a reputation for helping others.	☐	☐	☐
We are distant relatives (e.g., second cousins)	☐	☐	☐
This person supports the MPA.	☐	☐	☐
We are neighbors.	☐	☐	☐

We are interested in learning more about your fishing partners. Please think of the individuals that you work with most closely, and list their first name or initials in the spaces below. List up to five partners, and then tell us more about each of these people by answering the questions that follow.

	1st partner _____	**2nd partner** _____	**3rd partner** _____	**4th partner** _____	**5th partner** _____
Is this person male or female?	☐ male ☐ female	☐ male ☐ female	☐ male ☐ female	☐ male ☐ female	☐ male ☐ female
About how many years have you known this person?					
About how often have you fished with this person in the last year?	☐ more than 20 times ☐ 11-20 times ☐ 6-10 times ☐ 2-5 times	☐ more than 20 times ☐ 11-20 times ☐ 6-10 times ☐ 2-5 times	☐ more than 20 times ☐ 11-20 times ☐ 6-10 times ☐ 2-5 times	☐ more than 20 times ☐ 11-20 times ☐ 6-10 times ☐ 2-5 times	☐ more than 20 times ☐ 11-20 times ☐ 6-10 times ☐ 2-5 times

	☐ 1 time only	☐ 1 time only	☐ 1 time only	☐ 1 time only	☐ 1 time only
Would you say that this person tends to have more fishing partners than you, fewer partners, or about the same?	☐ more partners ☐ fewer partners ☐ about the same	☐ more partners ☐ fewer partners ☐ about the same	☐ more partners ☐ fewer partners ☐ about the same	☐ more partners ☐ fewer partners ☐ about the same	☐ more partners ☐ fewer partners ☐ about the same
Do you work with this person by choice?	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no	☐ yes ☐ no
Does this person work with any of your other fishing partners on a regular basis?	☐ yes, all of them ☐ yes, some of them ☐ none of them	☐ yes, all of them ☐ yes, some of them ☐ none of them	☐ yes, all of them ☐ yes, some of them ☐ none of them	☐ yes, all of them ☐ yes, some of them ☐ none of them	☐ yes, all of them ☐ yes, some of them ☐ none of them
Are you likely to work with this person in the future?	☐ definitely yes ☐ probably yes ☐ probably no ☐ definitely no	☐ definitely yes ☐ probably yes ☐ probably no ☐ definitely no	☐ definitely yes ☐ probably yes ☐ probably no ☐ definitely no	☐ definitely yes ☐ probably yes ☐ probably no ☐ definitely no	☐ definitely yes ☐ probably yes ☐ probably no ☐ definitely no

Open-ended questions

Under what circumstances, if ever, do you have no choice but to work with a particular person as a fishing partner?

Under what circumstances, if ever, would you refuse to work with another person as a fishing partner?

Player number: _____

Under what circumstances would you be very likely to choose a particular person as a fishing partner?

******* Please fill in if your fishing practices are influenced by an MPA in your area ********

Did you change your fishing practices since the establishment of MPAs in your area?

☐ I did not change my fishing practices

☐ I changed my fishing practices very little

☐ I moderately changed my fishing practices

☐ I changed my fishing practices a lot

Which of the following statements describes the best your involvement in the process of **MPA** implementation in your area:

☐ I was never invited to attend the implementation meeting(s)

☐ I was in a position to attend the implementation meeting(s)

☐ I attended at least one meeting

☐ I contributed my knowledge of and/or views about theMPA

Which of the following statements describes the best the local community involvement in the process of **MPA** implementation in your area:

☐ The local community did not contribute to the creation of MPA

☐ Local community members attended the meetings

☐ Local community members influenced final decision about the size and location of MPA

☐ Local community members decided on their own the size and location of the MPA

Do you agree with the following statements:

Situation	**Strongly agree** [1]	**Agree** [2]	**Disagree** [3]	**Strongly disagree** [4]	**Neutral** [5]
I think MPA helps to increase fish yields	☐	☐	☐	☐	☐

Player number: _____

I think that MPA protects fish stocks	☐	☐	☐	☐	☐
I think that MPA provides alternative sources of income	☐	☐	☐	☐	☐
I think that enforcement in the MPA works well	☐	☐	☐	☐	☐
I think that no-take zones in the MPA should be opened for fishing	☐	☐	☐	☐	☐

Could you tell me which of the following statements describes the best your position at the time that **MPA** was created?

☐ I strongly supported the creation of the MPA

☐ I supported the creation of the MPA

☐ I opposed the creation of the MPA

☐ I strongly opposed the creation of the MPA

☐ I had a neutral position

Could you tell me which of the following statements describes the best your position about the **MPA**today?

☐ I strongly support the MPA

☐ I support the MPA

☐ I oppose the MPA

☐ I strongly oppose the MPA

☐ I have a neutral position

Let us suppose that the **MPA** was never implemented. What do you think the status of the marine resources would have been in that case when compared to the present situation?

☐ Much better

☐ Slightly better

☐ The same

☐ Worse

☐ Much worse

A5 Experimental protocol 2012

EXPERIMENTAL PROTOCOL

TEMPLATE FOR ALL TREATMENTS/VARIANTS

When participants arrive

[Participants answer the pre-questionnaire.]

[Each participant arriving gets a random player number.]

[Participants are assigned a seat according to the player number.]

Basic instructions

Thank you all for coming today. My name is Victoria and this is Karla. Karla is a researcher at a university in Germany. In this game today, we want to play some games where you can earn a considerable amount of money that you are permitted to keep and take home. In these games you will have to make decisions that will influence your personal earning, but each of you will be given a show-up fee of 100 Pesos at the end for sure. [Show a 100 Peso bill.] The whole procedure will last around 3 hours. Thank you in advance for your effort and time.

Karla is working together with other researchers who are carrying out similar games all around the world.

1. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the game or not. **But if you feel uncomfortable already now, or you already know that you will not be able to stay for the three to four hours, then you should tell us now**.

2. It is very important that you understand the games. Therefore we will check your understanding by asking each of you test questions about the rules. If you do not understand the rules you may always ask the assistants to explain them. **But if you cannot answer the test questions after explaining them again, we will have to exclude you from the game and you receive only the show-up fee of 100 Pesos**. But don't worry, we will do our best to help you understand.

3. Before you get handed out your money at the end of the workshop, you are asked to answer a questionnaire. It is very important for our research, that you answer **all questions seriously**. You will receive your payment only after completing the questionnaire.

After knowing these rules, is there anybody who does not like to participate anymore?

[Wait some moments.]

There will be five games that are slightly different. At the beginning of each game, each of you will be given 200 Pesos [Show money]. You will make your decision on a sheet of paper. In each game you might lose some of this 200 Pesos. What you are able to keep from the initial 200 Pesos will be important for your final earnings. How much you keep in each game

depends on your decisions, decisions of others and luck. The 100 Pesos for coming to the workshop are always untouched.

We will draw a ball at the end to determine which of the five games will be paid out to you. **Just one of the five games is finally paid out.** [Show 5 balls with numbers] **This is why the outcomes in one game have no influence on the other games. So if you play a game, don't worry what happened in the games before. Just take each game seriously on its own, because it might be the one that is paid out.**

In the games you have to make decisions about small sums of money. Each decision you make is as good – there are no wrong decisions. Your decisions will be kept in private, **so just choose the option YOU like best!** After you played the games and answered your questionnaire at the end, one by one will come to Karla, who will hand out these earnings plus the show-up fee to you and you sign the receipt.

You all received a plastic bag with player number already. The player number is your personal number. You keep this number for all five games of the workshop and have to show them at the end in order to get paid. **So always remember to take the plastic bag with your player number with you.** After we have read aloud the instructions for the first game of the workshop, we will call you by your player number. Please follow the assistant if you are called.

There are some more rules for communication. During the game talking is strictly prohibited. You cannot ask questions or talk about the rules of the game to other participants while we are in the process of playing. If you have any questions, please raise your hand and wait until someone comes to answer your question in private. If you do not follow the rule you cannot participate in the game anymore and get no earnings from the games.

1st game

Let's start with the first game. All of you have 200 Pesos at the beginning of the game. We use play money to illustrate that the decisions that you take here are about real money.

[Show money]

In this game you can keep your 200 Peso or lose money. This will depend partly on your choices and partly on your luck. We here have an opaque bag with 27 balls in it. This means that there are as many balls in the bag as we have players today. Each player will have to draw one ball. Out of the 27 balls there are 18 white and 9 red balls. If you draw a white ball you can keep your 200 pesos. If you draw a red ball you lose all 200 pesos. That means that one of three players will lose and two out of three will not lose.

In Option A your earnings, 200 or 0, depend on chance. In Option A you can keep your 200 Peso when you draw a white ball; but you receive 0 Peso in the unfortunate case you draw a red ball.

Instead, you may also choose option B. You also have to draw a ball from the same opaque bag with 18 white and 9 red balls, but in option B you only lose 100 pesos if you draw a red ball. In return you have to pay a price of 40 pesos.

[show the following example with two assistants (one A, one B), deducting the relevant amounts]

Example: "For example if you chose option B, then you lose only 100 pesos if you draw a red ball and you would be left with 60 pesos, because you have to pay the price of 40. If you draw a white ball you lose nothing and you are left with 160 pesos, because you also have to pay the price of 40 pesos.
If you chose option A on the other hand you would lose everything with a red ball and you would be left with 0 pesos. With a white ball you would lose nothing and you would be left with 200 pesos."

[SHOW PARTICIPANT THE PAYOFF TABLE *make sure that the player is looking, seeing, and concentrating*].

Option A (pay 0)		☐ or ☐	**Option B** (pay 40)	
○ ○	●		○ ○	●
White ball (lose 0)	Red ball (lose 200)		White ball (lose 0)	Red ball (lose 100)
keep 200	keep 0		keep 160	keep 60

You will receive this sheet where you have to mark your decision.

Before we start, let me quickly explain how you will be paid for in this game. You will be paid based on your selected decision. After you have made your decision, everybody has to draw a ball from the opaque bag. Depending on the option you chose and whether you draw a white or red ball, you can keep or you will lose money as shown in the table before.

[Ask participants how much they would have left in each of the four cases]

These were the instructions of the procedure of the first game. Are there any questions or points that remained unclear and shall be explained in more detail? We will start with the test questions now. The assistants will afterwards ask you whether you prefer option B or option A.

[Call participants individually, distribute 200 pesos play money, ask test questions, let participants decide option, deduct price if option B]

[in big group draw balls and deduct money]

2nd Game

Let's start with the second game. Again all of you have 200 Pesos at the beginning of the game. Now you have no play money any more. You will make your decisions on a sheet of paper only, but the decisions that you take are still about real money. For the rest of the game we have formed groups, each consisting of 3 players. Each of the originally invited [point to the left side where originally invited sit] brought along two friends. One sits on the right side and will play with you [point to the right side]. The other sits in the middle and will not be in the same group. Instead, the third player in your group will be someone from the middle, but you will never know who it is exactly. And the ones in the middle will never know the two other group members they play with. From now on we will call the unknown players "Player X".

Whether you can keep your 200 Peso or lose money will depend partly on your choices and partly on your luck. For each group we now have an opaque bag with 3 balls in it. This means that there are as many balls in the bag as we have players in a group. Each player will have to draw one ball. Out of the 3 balls there are 2 white and 1 red ball. If you draw a white ball you can keep your 200 pesos. If you draw a red ball you lose all 200 pesos. That means that one of the three players in each group will lose everything and two out of three will not lose anything. There is no Option B like in the last game.

In this game the two winners can give money to the loser. Before knowing which ball you draw, all of you will be asked whether and how much they would like to send to the other two players of their group in case they will draw a red ball and lose 200 Peso. Remember that exactly one of you three will lose for sure. Remember also that you are not the only one who can transfer since there will always be two players with 200 Peso in your group. You can transfer between 0 and 70 of your 200 pesos to the loser. We will ask you to write down on a worksheet how much you would give to the other players. Amounts are in steps of 10 Peso. You can also transfer zero. So transfers are 0, 10, 20, 30, 40, 50, 60 or 70. Each transfer decision you make is as good – there are no wrong decisions. Your transfers will be kept in private, **so just choose the amount YOU like best! Remember it's real money.**

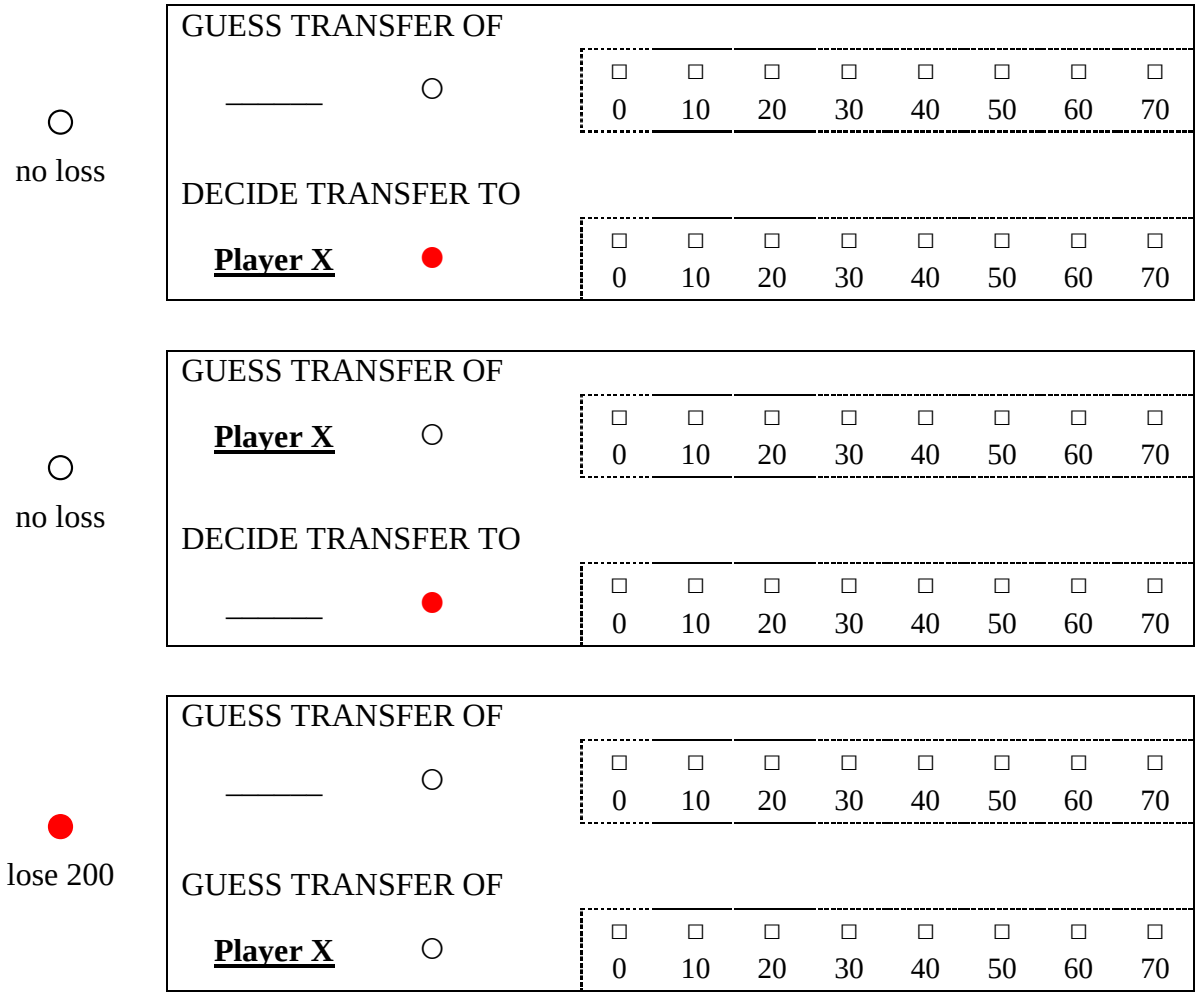
From now on we will call the group member you know _____ and the unknown group member _Player X_. For the players sitting in the middle [point] there will be two unknown players Player X and Player Y. So imagine you keep your 200 Peso and _Player X_ loses his entire 200 Peso. We will ask you to write down on the worksheet how much you give to _Player X_ in this case (0, 10, 20, 30, 40, 50, 60 or 70). Now imagine you keep your 200 Peso and _____ loses his entire 200 Peso. We will ask you to write down on the worksheet how much you give to _____ in this case (0, 10, 20, 30, 40, 50, 60 or 70).

We also want you to think about the transfer of the other winner in your group to the loser. Please guess the amounts that will be transferred. If you guessed correctly you will earn 10 pesos extra for each guess.

Lastly, it might also be that you draw the red ball and lose. For this case we ask you to guess how much _____ and _Player X_ would give to you in this case. We will never tell you

whether you were right. But Karla will look at the choice actually made by _____ and _Player X_ and compare their choices to your guess. If you guessed correctly you will earn 10 pesos extra for each guess. The best thing you can do to increase your payoff is to truthfully state what you think _____ and _Player X_ would do.

[SHOW AND EXPLAIN PARTICIPANT FORM *make sure that the player is looking, seeing, and concentrating*]



Your earnings in this game will depend on the colour of the ball you draw, the money you transfer or receive and your guess of the other transfers. If you draw a white ball you keep 200 Peso but might give some of it to the group member who lost. If you draw a red ball you lose all money and have nothing but you might get money from both group members. It is very important that you understand that we will not tell you in this game or any of the following games how much the other players give to you and who the anonymous group members are. The two group members that know each other will draw their balls first and then the bags with one ball left will be brought to Karla. Only she knows from which bag the people in the middle have to draw their ball. Did you understand everything? Will you [point to left and right side] know one member of your group? [Wait for an answer.] Will you know the other member? [Wait for an answer.] Will you [point to middle] know one member of your group? [Wait for an answer.] Will you know after this game what your group members gave you? [Wait for an answer.] Will you know it after the third game? [Wait for an answer.] Do you want me to explain this again?

These were the instructions of the procedure of the second game. Are there any questions or points that remained unclear and shall be explained in more detail? We will start with the test questions now. The assistants will afterwards let you fill in your decision sheet. For the two cases where you draw a white ball please write down how much you would give to the two

group members, respectively. For the case where you draw a red ball and lose everything, guess how much each of the other group members would give you.

[Call participants individually, ask test questions and let participants fill out forms]

[Let pairs draw balls, bring bags back to Karla, call anonymous players and let them draw from the corresponding bag (only Karla knows which one)]

3rd Game

Let's turn to the third game. The groups are the same as in the last round and again all of you have 200 Pesos at the beginning of the game. The first transfer decision in the game is similar to the game before. The second transfer decision which we call conditional transfer list is new. You have to make both decisions but you will not know which one is relevant for you in the end. From the two winners in each group one will transfer the unconditional transfer and for the other winner, Karla will use his/her conditional transfer list. In the transfer list you will chose your transfers conditional on what the loser is willing to give you.

In the conditional transfer list we ask you to decide how much you want to give to the loser **conditional on what he/she decided to transfer to you**. However, since you will not be told how much Pesos the loser would give to you we ask you to decide dependent on all possible transfers the loser could make. Only the relevant one will be your conditional transfer.

[show the following on poster]

For example we will ask you what you give to the loser, knowing that the loser would give for example 50 Peso to you when you lost your 200 Peso in this game. In the sheet we give you some examples and you can pick one of them. But if you don't like the examples and want to react differently to the possible transfers of your group member, just fill out the last column with your own numbers.

[explain on **one** poster all decisions that need to be taken by the participant]

After all participants in one group made their entries each of you will draw one ball to determine the person who lost his 200 Peso.

○ _____ ○ _____

Player X ●

I TRANSFER TO **Player X** _____

IF **Player X** DECIDED TO GIVE YOU…. (CONDITIONAL)	□	□	□	□	□
… 0, DECIDE YOUR TRANSFER	0	70	0	40	__
… 10, DECIDE YOUR TRANSFER	0	70	10	40	__
… 20, DECIDE YOUR TRANSFER	0	70	20	40	__
… 30, DECIDE YOUR TRANSFER	0	70	30	40	__
… 40, DECIDE YOUR TRANSFER	0	70	40	40	__
… 50, DECIDE YOUR TRANSFER	0	70	50	40	__
… 60, DECIDE YOUR TRANSFER	0	70	60	40	__
… 70, DECIDE YOUR TRANSFER	0	70	70	40	__

○ _____ **Player X** ○

_____ ●

DECIDE TRANSFER TO _____ _____

IF _____ DECIDED TO GIVE YOU…. (CONDITIONAL)	□	□	□	□	□
… 0, DECIDE YOUR TRANSFER	0	70	0	40	__
… 10, DECIDE YOUR TRANSFER	0	70	10	40	__
… 20, DECIDE YOUR TRANSFER	0	70	20	40	__
… 30, DECIDE YOUR TRANSFER	0	70	30	40	__
… 40, DECIDE YOUR TRANSFER	0	70	40	40	__
… 50, DECIDE YOUR TRANSFER	0	70	50	40	__
… 60, DECIDE YOUR TRANSFER	0	70	60	40	__
… 70, DECIDE YOUR TRANSFER	0	70	70	40	__

Do you have any questions? These were the instructions of the procedure of the third game. Are there any questions or points that remained unclear and shall be explained in more detail? We will now show the procedure again.

[Call participants and ask test questions]

We will distribute the decision sheets now. For the two cases where you draw a white ball please write down how much you would give to the two group members, respectively. For the case where you draw a red ball and lose everything, guess how much each of the other group members would give you.

[Let participants fill out form separated by screens and draw balls]

4th Game: Soli + Trust

[play and explain game like in game 2]

4th Game: Soli + Trust + Low Risk

[play and explain game like in game 2, but change payoffs]

4th Game: Soli + Trust + Insurance

Let's turn to the fourth game. The groups are the same as in the last round and again all of you have 200 Pesos at the beginning of the game.

This game is slightly different from the one before. It combines parts of game 1 and game 2. As in game one you can choose between option A and option B and additionally you can also make transfers to your group members as in game 2.

In Option A you can keep your 200 Peso when you draw a white ball; but you receive 0 Peso in the unfortunate case you draw a red ball.

In option B you also have to draw a ball from the same opaque bag with 2 white and 1 red balls, but in option B you only lose 100 pesos if you draw a red ball. In return you have to pay a price of 40 pesos.

> Example: "For example if you chose option B, then you lose only 100 pesos if you draw a red ball and you would be left with 60 pesos, because you have to pay the price of 40. If you draw a white ball you lose nothing and you are left with 160 pesos, because you also have to pay the price of 40 pesos.
> If you chose option A on the other hand you would lose everything with a red ball and you would be left with 0 pesos. With a white ball you would lose nothing and you would be left with 200 pesos."

After you have decided whether you prefer option A or option B the decision will be told to the other members of the group. As in game 2 the two winners can give money to the loser. Therefore, before knowing which ball you draw, all of you will be asked whether and how much they would like to send to the other two players of their group in case they will draw a red ball and lose 200 or 100 Peso. For example, the loser will lose 200 pesos with option A and 100 pesos with option B. How much your group members lose might be important for your transfer decision, this is why we tell you the decision. Remember that exactly one of you three will lose for sure. Remember also that you are not the only one who can transfer since there will always be two players with 200/160 Peso in your group. You can transfer between 0 and 70 of your 200/160 pesos to the loser. We will ask you to write down on a worksheet how much you would give to the other players. Amounts are in steps of 10 Peso. Note that your transfer amounts will never be told to the others.

> Example: "So imagine you chose option B and draw a white ball. You keep 160 Peso and one group member loses his entire 200 Peso. We will ask you to write down on the worksheet how much you give to this group member in this case (0, 10, 20, 30, 40, 50, 60 or 70). Now imagine you keep 160 Peso and the other group member only loses 100 Peso and pays 40 as a price for the option B. We will ask you to write down on the worksheet how much you give to this other group member in this case (0, 10, 20, 30, 40, 50, 60 or 70)."

Lastly, it might also be that you draw the red ball and lose. For this case we ask you to guess again how much your two group members would give to you in this case. We will never tell you whether you were right. But Karla will look at the choice actually made by the other two group member and compare their choices to your guess. If you guessed correctly you will earn 10 pesos extra for each guess. The best thing you can do to increase your payoff is to truthfully state what you think your group members would do.

[SHOW AND EXPLAIN PARTICIPANT FORM *make sure that the player is looking, seeing, and concentrating*]

○ you pay __

GUESS TRANSFER OF
_____( )
_____ ○

□	□	□	□	□	□	□	□
0	10	20	30	40	50	60	70

DECIDE TRANSFER TO
Player X ( ) ●
_____

□	□	□	□	□	□	□	□
0	10	20	30	40	50	60	70

○ you pay __

GUESS TRANSFER OF
Player X ( ) ○
_____

□	□	□	□	□	□	□	□
0	10	20	30	40	50	60	70

DECIDE TRANSFER TO
_____( ) ●
_____

□	□	□	□	□	□	□	□
0	10	20	30	40	50	60	70

● you lose ___ and pay __

GUESS TRANSFER OF
_____( ) ○
_____

□	□	□	□	□	□	□	□
0	10	20	30	40	50	60	70

GUESS TRANSFER OF
Player X ( ) ○
_____

□	□	□	□	□	□	□	□
0	10	20	30	40	50	60	70

Do you have any questions? These were the instructions of the procedure of the fourth game. Are there any questions or points that remained unclear and shall be explained in more detail?

[Call participants, ask test questions and let them decide about option A/B]

[Karla tells assistants the decisions of the group players, then players decide about transfers]

We will distribute the decision sheets now. For the two cases where you draw a white ball please write down how much you would give to the two group members, respectively. For the

case where you draw a red ball and lose everything, guess how much each of the other group members would give you.

[Let participants fill out form separated by screens and draw balls]

EGG Game

Now we would like to play a different game with you. For this game you will be again assigned to groups consisting of three players. The group member you already know from the previous games will stay the same, while the third group member will be newly assigned to your group. This member will NOT be the anonymous member of your group from the game before but someone else.

[Karla announces the new group formations, player x.1 and x.2 stay in the same group and a new NON Anonymous player is assigned to them]

[Assign groups, continue with instructions for the Egg game and implement game]

5th Game: Soli + Trust + Insurance

[play and explain game like in game 4: Soli + Trust + Insurance]

5th Game: Soli + Trust + Insurance + Communication

Let's turn to the fifth game. The groups are the same as in the egg game and again all of you have 200 Pesos at the beginning of the game.

This game combines elements of game 1 and game 2. For each group we now have an opaque bag with 3 balls in it. This means that there are as many balls in the bag as we have players in a group. Each player will have to draw one ball. Out of the 3 balls there are 2 white and 1 red ball. If you draw a white ball you can keep your 200 pesos. If you draw a red ball you lose all 200 pesos.

In Option A your earnings, 200 or 0, depend on chance. In Option A you can keep your 200 Peso when you draw a white ball; but you receive 0 Peso in the unfortunate case you draw a red ball.

Instead, you may also choose option B as in game 1. You also have to draw a ball from the same opaque bag with 2 white and 1 red balls, but in option B you only lose 100 pesos if you draw a red ball. In return you have to pay a price of 40 pesos.

Example: "For example if you chose option B, then you lose only 100 pesos if you draw a red ball and you would be left with 60 pesos, because you have to pay the price of 40. If you draw a white ball you lose nothing and you are left with 160 pesos, because you also have to pay the price of 40 pesos.
If you chose option A on the other hand you would lose everything with a red ball and you would be left with 0 pesos. With a white ball you would lose nothing and you would be left with 200 pesos."

This time you have the possibility to discuss within your group whether option A or option B is the better decision. But you can still decide on your own which option you prefer.

After you have decided whether you prefer option A or option B the decision will be told to the other members of the group. As in game 2 the two winners can give money to the loser. Therefore, before knowing which ball you draw, all of you will be asked whether and how much they would like to send to the other two players of their group in case they will draw a red ball and lose 200/100 Peso. For example, the loser will lose 200 pesos with option A and 100 pesos with option B. How much your group members lose might be important for your transfer decision, this is why we tell you the decision. Remember that exactly one of you three will lose for sure. Remember also that you are not the only one who can transfer since there will always be two players with 200/160 Peso in your group. You can transfer between 0 and 70 of your 200/160 pesos to the loser. We will ask you to write down on a worksheet how

much you would give to the other players. Amounts are in steps of 10 Peso. Note that your transfer amounts will never be told to the others.

> Example: "So imagine you chose option B and draw a white ball. You keep 160 Peso and one group member loses his entire 200 Peso. We will ask you to write down on the worksheet how much you give to this group member in this case (0, 10, 20, 30, 40, 50, 60 or 70). Now imagine you keep 160 Peso and the other group member only loses 100 Peso and pays 40 as a price for the option B. We will ask you to write down on the worksheet how much you give to this other group member in this case (0, 10, 20, 30, 40, 50, 60 or 70)."

Lastly, it might also be that you draw the red ball and lose. For this case we ask you to guess again how much your two group members would give to you in this case. We will never tell you whether you were right. But Karla will look at the choice actually made by the other two group member and compare their choices to your guess. If you guessed correctly you will earn 10 pesos extra for each guess. The best thing you can do to increase your payoff is to truthfully state what you think your group members would do.

> [SHOW AND EXPLAIN PARTICIPANT FORM *make sure that the player is looking, seeing, and concentrating*]

○ you pay 40	GUESS TRANSFER OF (B) pays 40	○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
	DECIDE TRANSFER TO (A) loses 200	●	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
○ you pay 40	GUESS TRANSFER OF (A) pays 0	○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
	DECIDE TRANSFER TO (B) loses 100+40	●	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
● you lose 100 and pay 40	GUESS TRANSFER OF (A) pays 0	○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
	GUESS TRANSFER OF B) Pays 40	○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70

Do you have any questions? These were the instructions of the procedure of the fifth game. Are there any questions or points that remained unclear and shall be explained in more detail?

[Call participants, ask test questions]

[Let them talk for some time and then individually decide about option A/B]

We will distribute the decision sheets now. For the two cases where you draw a white ball please write down how much you would give to the two group members, respectively. For the case where you draw a red ball and lose everything, guess how much each of the other group members would give you.

[Let participants fill out form separated by screens and draw balls]

5th Game: Soli + Trust + Insurance (Group) + Communication

Let's turn to the fifth game. The groups are the same as in the last round and again all of you have 200 Pesos at the beginning of the game.

This game combines elements of game 1 and game 2. For each group we now have an opaque bag with 3 balls in it. This means that there are as many balls in the bag as we have players in a group. Each player will have to draw one ball. Out of the 3 balls there are 2 white and 1 red ball. If you draw a white ball you can keep your 200 pesos. If you draw a red ball you lose all 200 pesos.

In Option A your earnings, 200 or 0, depend on chance. In Option A you can keep your 200 Peso when you draw a white ball; but you receive 0 Peso in the unfortunate case you draw a red ball.

Instead, you may also choose option B as in game 1. You also have to draw a ball from the same opaque bag with 2 white and 1 red balls, but in option B you only lose 100 pesos if you draw a red ball. In return you have to pay a price of 40 pesos.

Example: "For example if you chose option B, then you lose only 100 pesos if you draw a red ball and you would be left with 60 pesos, because you have to pay the price of 40. If you draw a white ball you lose nothing and you are left with 160 pesos, because you also have to pay the price of 40 pesos.
If you chose option A on the other hand you would lose everything with a red ball and you would be left with 0 pesos. With a white ball you would lose nothing and you would be left with 200 pesos."

You can only get option B if all three of you decide to take it. To discuss within your group whether option A or option B is the better decision you some time to talk. Then we will ask you individually which option you prefer. If all of you decide to take option B, all of you will get it. Otherwise nobody will get it. After you have decided whether you prefer option A or option B the group will be told if option B was jointly chosen or not.

As in game 2 the two winners can give money to the loser. Therefore, before knowing which ball you draw, all of you will be asked whether and how much they would like to send to the other two players of their group in case they will draw a red ball and lose 200/100 Peso. For example, the loser will lose 200 pesos with option A and 100 pesos with option B. How much your group members lose might be important for your transfer decision, this is why we tell you the decision. Remember that exactly one of you three will lose for sure. Remember also that you are not the only one who can transfer since there will always be two players with 200/160 Peso in your group. You can transfer between 0 and 70 of your 200/160 pesos to the loser. We will ask you to write down on a worksheet how much you would give to the other players. Amounts are in steps of 10 Peso. Note that your transfer amounts will never be told to the others.

Example: "So all of you took option B and you draw a white ball. You keep 160 Peso and one group member loses his entire 100 Peso plus pays a price of 40 pesos. We will ask you to write down on the worksheet how much you give to this group member in this case (0, 10, 20, 30, 40, 50, 60 or 70). Now imagine you keep 160 Peso and the other group member only loses 100 Peso and pays 40 as a price for the option B. We will ask you to write down on the worksheet how much you give to this other group member in this case (0, 10, 20, 30, 40, 50, 60 or 70)."

Lastly, it might also be that you draw the red ball and lose. For this case we ask you to guess again how much your two group members would give to you in this case. We will never tell you whether you were right. But Karla will look at the choice actually made by the other two group member and compare their choices to your guess. If you guessed correctly you will earn 10 pesos extra for each guess. The best thing you can do to increase your payoff is to truthfully state what you think your group members would do.

[SHOW AND EXPLAIN PARTICIPANT FORM *make sure that the player is looking, seeing, and concentrating*]

○ you pay 40

GUESS TRANSFER OF

(B) pays 40 ○

□ 0 □ 10 □ 20 □ 30 □ 40 □ 50 □ 60 □ 70

DECIDE TRANSFER TO

(B) loses 100+40 ●

□ 0 □ 10 □ 20 □ 30 □ 40 □ 50 □ 60 □ 70

○ you pay 40

GUESS TRANSFER OF

(B) pays 40 ○

□ 0 □ 10 □ 20 □ 30 □ 40 □ 50 □ 60 □ 70

DECIDE TRANSFER TO

(B) loses 100+40 ●

□ 0 □ 10 □ 20 □ 30 □ 40 □ 50 □ 60 □ 70

● you lose 100 and pay 40

GUESS TRANSFER OF

(B) pays 40 ○

□ 0 □ 10 □ 20 □ 30 □ 40 □ 50 □ 60 □ 70

GUESS TRANSFER OF

(B) Pays 40 ○

□ 0 □ 10 □ 20 □ 30 □ 40 □ 50 □ 60 □ 70

Do you have any questions? These were the instructions of the procedure of the fifth game. Are there any questions or points that remained unclear and shall be explained in more detail?

[Call participants, ask test questions]

[Let them talk for some time, then individually decide about option A/B and reveal group choice]

We will distribute the decision sheets now. For the two cases where you draw a white ball please write down how much you would give to the two group members, respectively. For the case where you draw a red ball and lose everything, guess how much each of the other group members would give you.

[Let participants fill out form separated by screens and draw balls]

Questionnaire and Payout

After having played all the five games we will now determine which one to pay out. We will put 5 numbered balls into the plastic bag from 1...5, and blindly draw one of those balls to determine which game everybody will be paid for.

Please recall the payment rules. There is a show-up fee of 100 Pesos plus we will draw one of five balls from the bag to determine the round we will pay out.

The result applies to all of you.

[Draw one ball. Alternatively, one of the participants can do it]

The result is… So you will later be paid out game …

Now please fill out the questionnaire that is handed out by the assistants. Then you are separately led to a private room where you get your final payments. You give the questionnaire to the instructor and sign a receipt to approve your received money and participation. The money consists of the show up fee, the money left after you transferred to others in game and the transfers you received from others in game.

Materials From 2016

A6 Pre experimental survey 2016

Player number: _____

QUESTIONNAIRE BEFORE THE EXPERIMENT

Date: _____

Barangay : _____

Participant's name: _____

Interviewer name: _____

	Please fill in here
Age	
Sex (0=M, 1=F)	
Educational attainment (1=Elementary, 2=High School, 3=Vocational Training, 4=College, 5=Master's Degree)	

Do you receive regular income? (0=No, 1=Yes)			
Income sources			
Name of income source	Average income **per month**	Income in a **good month**	Income in a **bad month**
Main occupation			
1.			
Additional occupation			
2.			
3.			
4. Fishery			
Do you have other sources of income?			
5.			
6. Remittances			

On average, how much does your **household** earn per month? (PhP)		
Household Head (1=Head, 2 = Spouse)		
Current Marital Status (1=Single, 2=Married; 3=Separated, 4=Widowed)		
How many people stay permanently (more than 6 months per year) in your household?		
How many people in **your household** are…	…0-6 years old?	
	…7-12 years old?	
	…13-17 years old?	
	…18-60 years old?	
	…>60 years old?	
Number of years living in this Barangay?		
In the last month, did anybody in the household reduce meals because there was not enough money for food?		
Do you have savings of more than 1000 pesos? (0=No, 1=Yes)		
Do you have savings of more than 5000 pesos? (0=No, 1=Yes)		
Do you owe money, labor or something else to somebody with a total value higher than 5000 Pesos? (0=No, 1=Yes)		
If yes, whom do you owe mainly? (1=to a bank/microfinance/money lender, 2=friend, 3=relatives, 9=other)		

Player number: _____

Please list all groups or organizations, committees, councils, associations, cooperatives to which you belong? These could be formally organized groups or just groups of people who get together regularly to do an activity or talk about things.

Name of the group:	Type of group (1=women group, 2=farmer/fisher association, 3=…)	Do you have a leading position in this group? If yes, which one?	How often per year do meetings take place?	How often per year do you go to the meetings	Do you pay membership fee? (if yes, note monthly amount)	How many hours per week do you engage in activities of this group?

How many days, in the past 3 months, have you worked with others in your community to do something for the benefit of the community? Please only think of community services that took at least half a day. _____

A7 Neutral priming

H_Survey Participant 0

Date:_____ Village:_____ Player number:_____

We now would like to know a little bit more about what you already did today. Could you please answer the following questions as truthfully as possible?

1. What have you eaten for breakfast today? *(Ask for details, sorts of dishes, if it was homemade or cooked by a person outside of the household, e.g. in a restaurant or sari sari,… etc.)*

   _____
   _____
   _____
   _____

2. What have you been doing after breakfast until now? *(Ask for details, kind of activities, was it work or leisure activities, etc…)*

   _____
   _____
   _____
   _____

A8 Positive priming

H_Survey Participant +1

Date:_____ Village:_____ Player number:_____

We would like to know more about a specific disaster (typhoon Yolanda/Hayan) that occurred in November 2013. Please try to remember the incident and answer the following questions as truthfully as possible.

1. We would like to know more about behavior of people after such a disaster. Can you remember reports or personally witnessed incidents where people have helped each other after typhoon Haiyan/Yolanda hit the island?	□Yes □No

2. If yes, what sorts of incidents were you thinking about specifically? *(read the question loudly and record on recording device)*

_____
_____
_____
_____

3. Could you imagine other sorts of incidents that show that good things happen even though a disaster just occured, and if yes, what may they be? *(read the question loudly and record on recording device)*

_____
_____
_____
_____

4. On a scale of 1-10, where one means "not likely at all" and ten means "very likely", how likely do you think is it that a catastrophe like Haiyan results in a better togetherness of people?

1	2	3	4	5	6	7	8	9	10
□	□	□	□	□	□	□	□	□	□

A9 Negative priming

H_Survey Participant -1

Date:_____ Village:_____ Player number:_____

We would like to know more about a specific disaster (typhoon Yolanda/Haiyan) that occurred in November 2013. Please try to remember the incident and answer the following questions as truthfully as possible.

1. We would like to know more about behavior of people after such a disaster. Can you remember any conflicts that happened because of Haiyan/Yolanda? This can be situations where people enriched themselves at the cost of others, became criminal, or behaved in other sorts of unwanted behavior.	□Yes □No

2. If yes, what sorts of incidents were you thinking about specifically? *(read the question loudly and record on recording device)*

_____
_____
_____
_____

3. Could you imagine other sorts of incidents that show that more bad things happen because of disasters, and if yes, what may they be? *(read the question loudly and record on recording device)*

_____
_____
_____
_____

4. On a scale of 1-10, where one means "not likely at all" and ten means "very likely", how likely do you think is it that a catastrophe like Haiyan results in a better togetherness of people?

1	2	3	4	5	6	7	8	9	10
□	□	□	□	□	□	□	□	□	□

A10 Post experimental survey 2016

Player number: _____

QUESTIONNAIRE AFTER THE EXPERIMENT

1. On a scale of 1-10, where one means "not likely at all" and ten means "very likely", how likely do you think is it that a catastrophe like Haiyan results in a worse togetherness of people?									
1	2	3	4	5	6	7	8	9	10
□	□	□	□	□	□	□	□	□	□

Time Preferences

[Start with the 1st question. Depending on whether the participant chooses the earlier or the delayed option, go to the respective next question. This procedure is repeated four times.]

Suppose you were given the choice between the following: receiving a payment today or a payment in 12 months. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months is different in every situation. For each of these situations we would like to know which you would choose.

1. Would you rather receive 1000 pesos today or 1538 pesos in 12 months?	□ today	*=> go to question 17*
	□ in 12 months	*=> go to question 2*
2. Would you rather receive 1000 pesos today or 1254 pesos in 12 months?	□ today	*=> go to question 10*
	□ in 12 months	*=> go to question 3*
3. Would you rather receive 1000 pesos today or 1124 pesos in 12 months?	□ today	*=> go to question 7*
	□ in 12 months	*=> go to question 4*
4. Would you rather receive 1000 pesos today or 1061 pesos in 12 months?	□ today	*=> go to question 6*
	□ in 12 months	*=> go to question 5*
5. Would you rather receive 1000 pesos today or 1030 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
6. Would you rather receive 1000 pesos today or 1092 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
7. Would you rather receive 1000 pesos today or 1188 pesos in 12 months?	□ today	*=> go to question 8*
	□ in 12 months	*=> go to question 9*
8. Would you rather receive 1000 pesos today or 1221 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
9. Would you rather receive 1000 pesos today or 1156 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
10. Would you rather receive 1000 pesos today or 1392 pesos in 12 months?	□ today	*=> go to question 14*
	□ in 12 months	*=> go to question 11*
11. Would you rather receive 1000 pesos today or 1323 pesos in 12 months?	□ today	*=> go to question 13*
	□ in 12 months	*=> go to question 12*
12. Would you rather receive 1000 pesos today or 1288 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*

Player number: _____

13. Would you rather receive 1000 pesos today or 1357 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
14. Would you rather receive 1000 pesos today or 1464 pesos in 12 months?	□ today	*=> go to question 16*
	□ in 12 months	*=> go to question 15*
15. Would you rather receive 1000 pesos today or 1428 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
16. Would you rather receive 1000 pesos today or 1501 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
17. Would you rather receive 1000 pesos today or 1850 pesos in 12 months?	□ today	*=> go to question 18*
	□ in 12 months	*=> go to question 25*
18. Would you rather receive 1000 pesos today or 2016 pesos in 12 months?	□ today	*=> go to question 22*
	□ in 12 months	*=> go to question 19*
19. Would you rather receive 1000 pesos today or 1932 pesos in 12 months?	□ today	*=> go to question 20*
	□ in 12 months	*=> go to question 21*
20. Would you rather receive 1000 pesos today or 1974 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
21. Would you rather receive 1000 pesos today or 1891 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
22. Would you rather receive 1000 pesos today or 2103 pesos in 12 months?	□ today	*=> go to question 23*
	□ in 12 months	*=> go to question 24*
23. Would you rather receive 1000 pesos today or 2146 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
24. Would you rather receive 1000 pesos today or 2059 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
25. Would you rather receive 1000 pesos today or 1690 pesos in 12 months?	□ today	*=> go to question 29*
	□ in 12 months	*=> go to question 26*
26. Would you rather receive 1000 pesos today or 1613 pesos in 12 months?	□ today	*=> go to question 28*
	□ in 12 months	*=> go to question 27*
27. Would you rather receive 1000 pesos today or 1575 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
28. Would you rather receive 1000 pesos today or 1651 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
29. Would you rather receive 1000 pesos today or 1769 pesos in 12 months?	□ today	*=> go to question 31*
	□ in 12 months	*=> go to question 30*
30. Would you rather receive 1000 pesos today or 1729 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*
31. Would you rather receive 1000 pesos today or 1809 pesos in 12 months?	□ today	*end*
	□ in 12 months	*end*

Player number: _____

1. Please tell me, in general, how willing or unwilling you are to take risks. Please tell us on a scale of 0-10, where 0 means "completely unwilling to take risks" and a 10 means you are "very willing to take risks".

completely unwilling to take risks **very willing to take risks**

0	1	2	3	4	5	6	7	8	9	10
□	□	□	□	□	□	□	□	□	□	□

2. On a scale of 0-10, where 0 means "completely unwilling to do so" and 10 means " very willing to do so", how willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?

completely unwilling to do so **very willing to do so**

0	1	2	3	4	5	6	7	8	9	10
□	□	□	□	□	□	□	□	□	□	□

3. Do you remember having played some of the games you played with us today before? (If you did not play them before just answer "not at all")

Not at all □ Very vaguely □ Somewhat □ Well □ Very well □

4. If well, or very well: Do you remember the exact year/month when you played them? What year was it? _____

5. If well, or very well: Do you remember how much money you received last time? If you cannot remember exactly, please guess. _____

6. How certain are you about this amount?

Not at all □ very little □ Somewhat □ rather certain □ Very certain □

7. Please tell us on a scale of one to five, where one means "I do not agree at all" and five means "I agree completely", to what extent you agree to the following statements regarding your behaviour in the games from the last session in 2012:

	I do not agree at all	**I slightly agree**	**I somewhat agree**	**I mostly agree**	**I agree completely**		**I don't know**
I was satisfied with the amount of money that I received last	□	□	□	□	□		□

time.							
I think I will get more money this time than last time.	☐	☐	☐	☐	☐		☐
Last time I made decisions, which I regretted for some time.	☐	☐	☐	☐	☐		☐
I believed in the anonymity of the experiment.	☐	☐	☐	☐	☐		☐
I felt under pressure to behave in a certain way	☐	☐	☐	☐	☐		☐
I talked to my friends about the amount of money I earned.	☐	☐	☐	☐	☐		☐
I was harassed afterwards for my decisions in the experiment.	☐	☐	☐	☐	☐		☐

8. Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?

   ☐ Most people can be trusted.
   ☐ Need to be very careful.

9. On the household list provided, please indicate other people in the village you have certain relationships with—whether you are friends, count on each other for support, or have given or received actual help after the 2013 typhoon. Please mark each name with the following letter of you have the following relationships with them (this information will remain strictly confidential):

   F: Please put an F next to the names of people you consider to be a close friend (these are people you feel at ease with, or can talk to about private matters).

   S: Please put an S next to the names of people you would rely on for help when needed, for example to borrow money or get advice when needed.

   R: Please put an R next to the names of people you have actually received help from after the 2013 typhoon, e.g., to borrow money or resources.

   G: Please put a G next to the names of people you actually gave help to after the 2013 typhoon, e.g., to loan money or resources.

Player number: _____

The following statements may apply more or less to you. To what extent do you think each statement applies to you personally?

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I can rely on my own abilities in difficult situations.	☐	☐	☐	☐	☐
I am able to solve most problems on my own.	☐	☐	☐	☐	☐
Sometimes I do things impulsively that I shouldn't do.	☐	☐	☐	☐	☐
I sometimes do things to cheer myself up that I later regret.	☐	☐	☐	☐	☐
I usually think carefully before I act.	☐	☐	☐	☐	☐
I always bring to an end what I have started.	☐	☐	☐	☐	☐
I plan my schedule so that I get everything done on time.	☐	☐	☐	☐	☐
Whether at work or in my private life: What I do is mainly determined by others.	☐	☐	☐	☐	☐
Fate often gets in the way of my plans.	☐	☐	☐	☐	☐
I respect the majority's wishes in groups of which I am a member	☐	☐	☐	☐	☐
Without competition it is not possible to have a good society	☐	☐	☐	☐	☐
I feel good when I co-operate with others	☐	☐	☐	☐	☐
Most people can learn to be leaders- it's not a matter of birth.	☐	☐	☐	☐	☐
Our leaders know what is best for us	☐	☐	☐	☐	☐
Young people today do not have enough respect for traditional values	☐	☐	☐	☐	☐
Schools should teach children to obey authority	☐	☐	☐	☐	☐
I see myself as someone who is reserved	☐	☐	☐	☐	☐
I see myself as someone who tends to be lazy	☐	☐	☐	☐	☐
I see myself as someone who is relaxed, handles stress well	☐	☐	☐	☐	☐
I see myself as someone who is outgoing, sociable	☐	☐	☐	☐	☐
I see myself as someone who tends to find fault with others	☐	☐	☐	☐	☐
I see myself as someone who does a thorough job	☐	☐	☐	☐	☐
I see myself as someone who gets nervous easily	☐	☐	☐	☐	☐
I see myself as someone who has an active imagination	☐	☐	☐	☐	☐

Player number: _____

The next question deals with optimism. Optimists are people who look to the future with confidence and who mostly expect good things to happen. How would you describe yourself?

How optimistic are you in general?

Not optimistic at all	a bit optimistic	Somewhat optimistic	Mostly optimistic	Completely optimistic
☐	☐	☐	☐	☐

People react to unfair situations in very different ways. In the following I would like to ask you how you would react in unfair situations. I will now read you several statements. Please tell me to what extent each of these statements apply to you. If you have never experienced such a situation yourself, try to imagine how you would react if you were in such a situation.

10. First, we will look at situations to the advantage of others and to **your own disadvantage**.

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I am upset when others are better off than me.	☐	☐	☐	☐	☐
I am upset when others are **undeservingly** better off than me.	☐	☐	☐	☐	☐
I feel good when I sacrifice for others	☐	☐	☐	☐	☐

11. Now, we will look at situations in which you notice or learn that **someone else** is being treated unfairly, put at a disadvantage, or used.

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I am upset when someone is undeservingly worse off than others.	☐	☐	☐	☐	☐
I feel pity when someone is undeservingly worse off than others.	☐	☐	☐	☐	☐

12. Now, we will look at situations that turn out **to your advantage** and to the disadvantage of others.

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I feel guilty when I am better off than others.	☐	☐	☐	☐	☐
I feel guilty when I am **undeservingly** better off than others.	☐	☐	☐	☐	☐

13. Now, we look at situations in which **you** treat someone else unfairly, discriminate against someone or exploit them.

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I feel guilty when I enrich myself at the cost of others.	☐	☐	☐	☐	☐
I feel clever when I use tricks to achieve something while others have to struggle for it	☐	☐	☐	☐	☐

14. Finally, please fill in the table below:

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely
I like to gossip at times.	☐	☐	☐	☐	☐
There have been occasions when I took advantage of someone.	☐	☐	☐	☐	☐
I'm always willing to admit it when I make a mistake.	☐	☐	☐	☐	☐
I always try to practice what I preach.	☐	☐	☐	☐	☐
I sometimes try to get even rather than forgive and forget.	☐	☐	☐	☐	☐
At times I have really insisted on having things my own way.	☐	☐	☐	☐	☐
There have been occasions where I felt like smashing things.	☐	☐	☐	☐	☐
I never resent being asked to return a favour.	☐	☐	☐	☐	☐
I have never been irked when people expressed ideas very different from my own.	☐	☐	☐	☐	☐
I have never deliberately said something that hurt someone's feelings.	☐	☐	☐	☐	☐

Player number: _____

15. There are many different organizations or group of people involved in important aspects of your life, ranging from the federal government to your neighbouring cooperatives and NGOs. In general, when thinking about each organization below, would you say you completely distrust them, completely trust them, or are you somewhere in between?

Organization:	Completely distrust	Distrust	Neither trust nor distrust	Trust	Completely trust	Would you ask for advice to these groups in case you have a problem?	
	[1]	[2]	[3]	[4]	[5]	Yes	No
National Government	☐	☐	☐	☐	☐	☐	☐
Provincial Government	☐	☐	☐	☐	☐	☐	☐
Municipal/ City government officials (LGU)	☐	☐	☐	☐	☐	☐	☐
Barangay captain	☐	☐	☐	☐	☐	☐	☐
Barangay kagawats	☐	☐	☐	☐	☐	☐	☐
People from your barangay	☐	☐	☐	☐	☐	☐	☐
Fishers from your barangay	☐	☐	☐	☐	☐	☐	☐
NGOs	☐	☐	☐	☐	☐	☐	☐
FARMC	☐	☐	☐	☐	☐	☐	☐
MPA committee	☐	☐	☐	☐	☐	☐	☐
fishermen association	☐	☐	☐	☐	☐	☐	☐
Church	☐	☐	☐	☐	☐	☐	☐

16. To what extent do you believe you would receive support in case of emergency by the following people/institutions on a scale from 1 to 5 (with 1 being “doesn’t apply at all” and 5 being “applies completely”)?

	doesn't apply at all	applies slightly	applies moderately	applies mostly	applies completely	Did you turn to these groups in case you needed financial support in an emergency situation?	
						Yes	No
Relatives within Barangay	☐	☐	☐	☐	☐	☐	☐
Friends within Barangay	☐	☐	☐	☐	☐	☐	☐
Fishermen within Barangay	☐	☐	☐	☐	☐	☐	☐
Neighbors	☐	☐	☐	☐	☐	☐	☐
Barangay Captain	☐	☐	☐	☐	☐	☐	☐
Barangay kagawats	☐	☐	☐	☐	☐	☐	☐
My Bank	☐	☐	☐	☐	☐	☐	☐
My insurance provider	☐	☐	☐	☐	☐	☐	☐
FARMC	☐	☐	☐	☐	☐	☐	☐

Player number: _____

General Information about Fishing Activity

01: What kind of gear do you currently use for fishing?

☐ Net if yes: what mesh size do you use? ___

☐ Spear gun

☐ Hook and line

☐ other – please specify: _____

☐ other – please specify: _____

☐ other – please specify: _____

02: Do you currently fish together with a group of people? ☐ Yes ☐ No

03: How many fishers (including yourself) are you when you go fishing? ___

04: Who owns the boat, boat motor and fishing gear you currently use?

☐Myself ☐Another fisherman

☐Fish buyer ☐Cooperative

☐Other: _____ (specify)

If it is not your own boat:

05: do you get paid in cash, fish or both? ☐ cash ☐fish ☐both

If it is your own boat:

06: do you pay others in cash, fish or both? ☐ cash ☐fish ☐both

07: Do you see other fishermen from <u>your barangay</u> rather as

☐ friends / or

☐ competitors?

☐ or both?

08: Do you see other the fishermen from <u>neighboring barangays</u> rather as

☐ friends / or

☐competitors?

☐or both?

09: Are there any marine resources in your community (certain fish species, corals, mangroves) that you think diminished in abundance over the last few years?

☐ Yes ☐ No

10: If yes: Which one?

☐ Corals ☐ Fish ☐Mangroves

☐ Algae / Seaweed ☐ Other: _____

11: Why do you think so?

_____

_____

12: Are there any marine resources in your community (certain fish species, corals, mangroves) that you think have recovered over the last few years?

☐ Yes ☐ No

13: If yes: Which one?

☐ Corals ☐ Fish ☐Mangroves

☐ Algae / Seaweed ☐ Other: _____

14: Why do you think so?

_____

_____

15: I will read you a list of issues that may or may not affect fisheries in the area. For each, could you tell me if it is a problem, and if it is, how important is it?

Problem	**Not a problem [1]**	**Almost not a problem [2]**	**Problem [3]**	**Important problem [4]**	**Very important problem [5]**
Corruption within local government units	☐	☐	☐	☐	☐
Lack of adequate laws	☐	☐	☐	☐	☐
Lack of monitoring	☐	☐	☐	☐	☐
Lack of support for monitoring	☐	☐	☐	☐	☐
Competition with industrial fisheries	☐	☐	☐	☐	☐
Competition with recreational fisheries or tourism activities	☐	☐	☐	☐	☐
Competition with fishers from other states	☐	☐	☐	☐	☐
Too many fishermen	☐	☐	☐	☐	☐

Lack of zoning	☐	☐	☐	☐	☐
Marine pollution	☐	☐	☐	☐	☐
Lack of organization among fishermen from this barangay	☐	☐	☐	☐	☐
fishermen from this barangay do not respect rules	☐	☐	☐	☐	☐
fishermen from other barangays do not respect rules	☐	☐	☐	☐	☐
Bad prices for fish	☐	☐	☐	☐	☐
Lack of alternative income possibilities	☐	☐	☐	☐	☐
Lack of technical support	☐	☐	☐	☐	☐
Disputes among fishermen	☐	☐	☐	☐	☐
Lack of togetherness between fishermen	☐	☐	☐	☐	☐
Stealing or vandalism e.g. destruction of fishing gear	☐	☐	☐	☐	☐
Violence between fishermen	☐	☐	☐	☐	☐
Banks do not give credit to invest in fishing business	☐	☐	☐	☐	☐
Uncertain catch due to bad weather	☐	☐	☐	☐	☐

16: Which of the following rules and regulations about fishing exist in your area?

Regulation			**Do you think this rule is good?**		**Have you been consulted regarding the creation of this rule?**		**In percent, how many fishers in your community adhere to the rules and regulations for fishing?**
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	
Areas where you are not allowed to fish at all	☐	☐	☐	☐	☐	☐	
Prohibited to use Cyanide	☐	☐	☐	☐	☐	☐	
Prohibited to use Dynamite	☐	☐	☐	☐	☐	☐	
Prohibited to use specific mesh sizes	☐	☐	☐	☐	☐	☐	
Seasonal restrictions to fish	☐	☐	☐	☐	☐	☐	
Certain species you are not allowed to fish	☐	☐	☐	☐	☐	☐	
Is there another rule that was not mentioned in the list?	☐	☐	☐	☐	☐	☐	

Other: _____							

17: How many times have you participated in some type of inspection and enforcement activities in the past year? _____

18: How often have you made an official complaint about other fishermen in the last two years? _____

19: To which authority do you normally go to complain? _____

20: On a scale of one to five, where **one means very badly** and **five means very well**, how well do the leaders of the following groups from your village represent your interests as a fisher?

	Very badly [1]	**badly [2]**	**Neither well nor badly [3]**	**well [4]**	**Very well [5]**		**I do not know**
BFARMC	☐	☐	☐	☐	☐		☐
Fishermen organization	☐	☐	☐	☐	☐		☐
MPA committee	☐	☐	☐	☐	☐		☐
Other:_____	☐	☐	☐	☐	☐		☐
Other:_____	☐	☐	☐	☐	☐		☐

21: Did you change your fishing practices in the last 10 years?

☐ I did not change my fishing practices

☐ I changed my fishing practices very little

☐ I moderately changed my fishing practices

☐ I changed my fishing practices a lot

If you changed, what did you change specifically?

_____

_____

If you changed can you tell me why you did so?

_____

_____

Player number: _____

**** NETWORKS (ONLY FOR FISHERMEN) ****

We are interested in learning more about your fishing partners. Please refer to the household list and list the numbers next to the names of the fishing partners you work with most closely. If their name does not appear on the list provided, write their name on the line below. You may list up to five partners.

After listing your fishing partners, tell us more about each of these people by answering the questions that follow.

	_____ 1st partner	_____ 2nd partner	_____ 3rd partner	_____ 4th partner	_____ 5th partner
About how many years have you known this person?					
About how often have you fished with this person in the last year?	□ more than 20 times □ 11-20 times □ 6-10 times □ 2-5 times □ 1 time only	□ more than 20 times □ 11-20 times □ 6-10 times □ 2-5 times □ 1 time only	□ more than 20 times □ 11-20 times □ 6-10 times □ 2-5 times □ 1 time only	□ more than 20 times □ 11-20 times □ 6-10 times □ 2-5 times □ 1 time only	□ more than 20 times □ 11-20 times □ 6-10 times □ 2-5 times □ 1 time only
Would you say that this person tends to have more fishing partners than you, fewer partners, or about the same?	□ more partners □ fewer partners □ about the same	□ more partners □ fewer partners □ about the same	□ more partners □ fewer partners □ about the same	□ more partners □ fewer partners □ about the same	□ more partners □ fewer partners □ about the same
Do you work with this person by choice?	□ yes □ no	□ yes □ no	□ yes □ no	□ yes □ no	□ yes □ no
Does this person work with any of your other fishing partners on a regular basis?	□ yes, all of them □ yes, some of them □ none of them	□ yes, all of them □ yes, some of them □ none of them	□ yes, all of them □ yes, some of them □ none of them	□ yes, all of them □ yes, some of them □ none of them	□ yes, all of them □ yes, some of them □ none of them
Does this person share your views about issues in your village/ MPA?	□ yes, completely □ yes, somewhat □ no □ don't know	□ yes, completely □ yes, somewhat □ no □ don't know	□ yes, completely □ yes, somewhat □ no □ don't know	□ yes, completely □ yes, somewhat □ no □ don't know	□ yes, completely □ yes, somewhat □ no □ don't know
Does this person have access to resources,	□ yes	□ yes	□ yes	□ yes	□ yes

such as gear or knowledge, that you do not have?	□ no	□ no	□ no	□ no	□ no
If you were in need, would you rely on this person for help (e.g., to borrow money)?	□ yes □ no	□ yes □ no	□ yes □ no	□ yes □ no	□ yes □ no

Player number: _____

01: Are your fishing practices influenced by an MPA ☐ Yes ☐ No

If yes, continue:

02: In your own opinion, what kind of advantages are there to have a marine protected area in your community?

☐ MPA increases fish yields ☐ MPA protects fish stocks ☐MPA provides alternative income sources

☐ Other:

_____
_____
_____

03: In your own opinion, what kind of disadvantages are there to have a marine protected area in your community?

☐ No-take zones (should be opened for fishing) ☐ enforcement does not work well

☐ Other:

_____
_____
_____

04: Do you agree with the following statements:

Situation	**Strongly disagree** [1]	**Disagree** [2]	**Neutral** [3]	**Agree** [4]	**Strongly agree** [5]
I think MPA helps to increase fish yields	☐	☐	☐	☐	☐
I think that MPA protects fish stocks	☐	☐	☐	☐	☐
I think that MPA provides alternative sources of income	☐	☐	☐	☐	☐
I think that enforcement in the MPA works well	☐	☐	☐	☐	☐
I think that no-take zones in the MPA should be opened for fishing	☐	☐	☐	☐	☐

05: Could you tell me which of the following statements describes your position about the **MPA** today the best?

☐I strongly support the MPA

☐I support the MPA

☐I oppose the MPA

☐I strongly oppose the MPA

☐I have a neutral position

Player number: _____

****** ONLY FOR 2013 KAGAWARD CANDIDATES ******

1. How happy were you with the number of votes you obtained in the last election

Completely dissatisfied	Mostly dissatisfied	Somewhat dissatisfied	Neither satisfied or dissatisfied	Somewhat satisfied	Mostly satisfied	Completely satisfied
□	□	□	□	□	□	□

2. If you are kagawat since the elections 2013, is this your first, second or third term _____

3. If you are <u>not</u> kagawat since the elections 2013. How many terms did you serve before? _____

4. Did you make any promises while you were running for kagawat? □ Yes □ No
5. If yes, could you keep them? □ Yes □ No

6. Which of the following characteristics did you want the voters to identify you most with? (choose only one)

□ honest and incorrupt
□ good connections and influential
□ being very religious
□ being sociable
□ having good knowledge
□ having high status
□ helping others'
□ others: _____

7. Do you think it is personally rewarding to be kagawat? □ Yes □ No
8. Do you think it is financially rewarding to be kagawat? □ Yes □ No
9. Would you have run for kagawat if there was no additional payment? □ Yes □ No
10. Were you disappointed by the number of votes you obtained and therefore reduced your involvement into the community? □ Yes □ No
11. Did you apply for any other political position besides kagawat? □ Yes □ No
12. If yes, which one? _____
13. Are you running for kagawat in 2016? □ Yes □ No
14. Which political party do you belong to (if any)? _____

Player number: _____

A: exposure to Yolanda/Haiyan

We would like to know more about a specific disaster (typhoon Yolanda/Hayan) that occurred in November 2013. Please try to remember the incident and answer the following questions as truthfully as possible.

1. **Where have you been at the time when the typhoon hit the Philippines?**

□ in my house
□ another house in the village
□ in another village
□ in an evacuation center
□ other (please specify):_____

2. **How many hours before typhoon Yolanda/Haiyan hit the Island did you realize that this would happen?** _____

3. **How many people from your village left the village because they knew that a storm was coming?**

almost none	little	some	many	almost all
□	□	□	□	□

4. **Did you take any preparatory measures?** □ Yes □ No

5. **If you answered with yes, what kind of preparatory measures did you take?**

□ reinforced the house
□ brought my property to a safer place
□ stored additional food and drink
□ other (please specify):_____
□ other (please specify):_____
□ other (please specify):_____

6. **Please fill in the table below with information concerning the various types of material harms/damages that were caused by the typhoon. Please tell us, which of the following were harmed/damaged because of the typhoon and how much time and money it took them to be repaired/recovered. (*Leave blank if the mentioned item was not there before the typhoon*)**

	Damaged	How many days did it take to repair/recover?	How much money (PHP) did it cost you to repair/recover?	How is the item from the list today? Is it in the same, a better or a worse condition than before the storm?		
my house	□ Yes □ No			□ same	□ better	□ worse
my motorbike	□ Yes □ No			□ same	□ better	□ worse
my car	□ Yes □ No			□ same	□ better	□ worse
my boat	□ Yes □ No			□ same	□ better	□ worse
material I need for work	□ Yes □ No			□ same	□ better	□ worse
my crops	□ Yes □ No			□ same	□ better	□ worse

7. **Please fill in the table below concerning harms to cattle, friends and family members that were caused by the typhoon. Please tell us on a scale of one to seven (where one means "not harmed at all" and seven means "maximum amount of harm") the level of harm for each item in the list.**

	1	2	3	4	5	6	7
Neighbors	□	□	□	□	□	□	□
friends from this village	□	□	□	□	□	□	□
family members from this village	□	□	□	□	□	□	□
friends from other villages	□	□	□	□	□	□	□
family members living in other villages	□	□	□	□	□	□	□
cattle and big farm animals	□	□	□	□	□	□	□
chicken and small farm animals	□	□	□	□	□	□	□

Player number: _____

8. **On a scale from one to seven, where one means "no pressure at all" and seven means "maximum amount of pressure", how much pressure was caused by the typhoon…**

	1	2	3	4	5	6	7
…financially?	□	□	□	□	□	□	□
…personally?	□	□	□	□	□	□	□

9. **On a scale from one to seven, where one means "much worse off than others" and seven means "much better off than others", how much pressure was caused by the typhoon relative to other people in your barangay…**

	1	2	3	4	5	6	7
…financially?	□	□	□	□	□	□	□
…personally?	□	□	□	□	□	□	□

10. **What kind of materials was your house made of before the storm?**

_____

_____

_____

11. **How far, in meters, is your house away from the ocean?** _____ meters

Player number: _____

B: Rehabilitation after Yolanda/Hayan

1. **Were you in need of aid after typhoon Haiyan?** □ Yes □ No

2. **Please fill in the table below with information concerning people and/or organizations that helped with reconstruction or financial aid <u>after</u> typhoon Yolanda hit the Island. Please tell us, on a scale of one to seven (where one means "no help at all" and seven means "most proficient help") how much the following groups and organizations helped YOU or other people in your barangay.**

Organization/group	1	2	3	4	5	6	7
friends	□	□	□	□	□	□	□
neighbors	□	□	□	□	□	□	□
National government	□	□	□	□	□	□	□
Local government	□	□	□	□	□	□	□
Barangay council	□	□	□	□	□	□	□
National/local NGOs	□	□	□	□	□	□	□
International NGOs	□	□	□	□	□	□	□
church	□	□	□	□	□	□	□
Other:_____	□	□	□	□	□	□	□
Other:_____	□	□	□	□	□	□	□
Other:_____	□	□	□	□	□	□	□

3. **Below is a list of statements. Please tell us on a scale from one to seven, where one means "I do not agree at all" and seven means "I agree completely", to what extent the following statements are true according to your opinion.**

	1	2	3	4	5	6	7
The distribution of aid was fair.	□	□	□	□	□	□	□
The amount of aid was sufficient.	□	□	□	□	□	□	□
The distribution of aid was well organized.	□	□	□	□	□	□	□
Some members of the community received more aid than they needed.	□	□	□	□	□	□	□
People were trying to get aid for themselves and did not consider other people in need.	□	□	□	□	□	□	□
I felt left alone with my problems.	□	□	□	□	□	□	□
I received help from people that I would not have thougt to help me.	□	□	□	□	□	□	□
I tried to help wherever I could.	□	□	□	□	□	□	□

Player number: _____

I feel closer to the people in my barangay than before "Haiyan".	□	□	□	□	□	□	□
There was a large amount of conflict between people because of a lack of aid.	□	□	□	□	□	□	□

4. Did you rebuild your house at the same spot? □ Yes □ No

Player number: _____

5. **Below is a table with a list of practices to provide aid to different groups of people in different sorts of ways.**

   On the left hand side, rank the following practice from 1-9, where "1" reflects the practice that should be primarily used and "9" reflects the least important. You can only use each number from 1-9 once. (*fill out this part completely, then proceed***)**

   On the right hand side, please tell us which practice was actually used according to your opinion, where "1" reflects the practice that was primarily used and "9" reflects the least applied strategy. You can only use each number from 1-9 once. (*If one item from the list was not applied in this barangay, enter 9***)**

(DESIRED PRACTICE] **…shall be…**		**(ACTUAL PRACTICE]** **…how it actually happened…**
	According to people's exposure. The higher the suffering or damage, the higher the relief.	
	Egalitarian. This means all people from the Barangay receive the same amount of aid, regardless their losses.	
	Egalitarian towards exposed. This means all people that lost something because of the typhoon receive the same amount of aid, regardless if some suffered more or less. People that are not affected receive nothing.	
	Priority on people that had a difficult life before the typhoon already (i.e. only highly vulnerable victims such as disabled persons, female headed households and/or with majority elderly and children or households with single source of income which is based on a vulnerable industry)	
	Priority on people that prepared more for the typhoon than others. (i.e. particularly, only those victims who conducted preparatory measures and who have not (re-)built their homes in high-risk areas, or individuals with disaster insurance)	
	People who do not receive remittances.	
	First come first serve.	
	No-one receives aid.	
	Other (please specifiy): _____	

Player number: _____

[CORRUPTION]

1. Please tell us on a scale of one to seven how often the following scenarios happened in your Barangay. Keep in mind that everything you say is anonymous and will not be traceable to you.	Likelihood 1 to 7 Rank how likely this is to occur: 1 = never occurred 2 = very seldom 3 = seldom 4 = sometimes 5 = often 6 = very often 7 = all the time	I do not know	Do you perceive this as corruption?		Have you ever seen this happening personally?	
People that had better relations to the persons responsible for aid provision received higher amounts of goods and services.		□	□ Yes	□ No	□ Yes	□ No
People that had better relations to the persons responsible for aid provision received goods and services sooner than others.		□	□ Yes	□ No	□ Yes	□ No
People registered more than once for assistance and/or falsely claimed vulnerability in order to receive more aid.		□	□ Yes	□ No	□ Yes	□ No
People had to provide goods and services (either in cash or in kind) to receive aid. Otherwise they were excluded from receiving aid.		□	□ Yes	□ No	□ Yes	□ No
Affected people tried to receive relief goods that were entitled to other people in the village.		□	□ Yes	□ No	□ Yes	□ No
Affected people took at the expense of others because they did not receive enough aid after the typhoon.		□	□ Yes	□ No	□ Yes	□ No
Recipients were given less aid as was promised to them.		□	□ Yes	□ No	□ Yes	□ No
Individuals or groups of people received financial aid and/or relief goods despite not being entitled to it.		□	□ Yes	□ No	□ Yes	□ No
People shared their part of received aid assistance with those excluded from aid		□	□ Yes	□ No	□ Yes	□ No
Goods and services (e.g. reconstruction) that were		□	□ Yes	□ No	□ Yes	□ No

provided as aid were out of date or below promised quality.						
People responsible for aid distribution kept goods meant for aid distribution for themselves.		□	□ Yes	□ No	□ Yes	□ No
Women were excluded from goods and services.		□	□ Yes	□ No	□ Yes	□ No
People responsible for aid provision had an extravagant life-style during their assistance		□	□ Yes	□ No	□ Yes	□ No
RESPONSE TO MENTIONED INCIDENTS: Were people able to make official complaints if they thought that there was anything wrong with the selection of who would get aid or how it was distributed? □ Yes □ No						
Filing official complaints if people responsible for aid provision misbehaved.		□	□ Yes	□ No	□ Yes	□ No

Player number: _____

For this study, we use the following definition of corruption:

Corruption as abuse of entrusted power for its private gain, financial mismanagement and fraud. Private gain might refer to persons but also to families, a village, groups of people and others. Power can also be abused in many other ways, such as favouring family members, sexual exploitation and giving aid to people that are not in need of it on purpose.

1. On a scale from one to seven, where one means "no corruption" and seven means "highest level of corruption possible": How do you perceive corruption...

Corruption Perception	**1**	**2**	**3**	**4**	**5**	**6**	**7**		**I don't know**
…in Your barangay in 2012?	☐	☐	☐	☐	☐	☐	☐		☐
…in Your barangay today?	☐	☐	☐	☐	☐	☐	☐		☐
…of Barangay leaders today?	☐	☐	☐	☐	☐	☐	☐		☐
Municipal leaders	☐	☐	☐	☐	☐	☐	☐		☐
Provincial Government	☐	☐	☐	☐	☐	☐	☐		☐
National Government	☐	☐	☐	☐	☐	☐	☐		☐
NGOs	☐	☐	☐	☐	☐	☐	☐		☐

A11 Experimental protocol 2016

EXPERIMENTAL PROTOCOL
TEMPLATE FOR ALL TREATMENTS/VARIANTS

[…] Contents of brackets are only for orientation. Do not read out loudly.

[When participants arrive]
Hello and thank you for coming. Before we start with our workshop for today, I would like to give you your personal gamer tag [ID-card]. Please keep this tag always with you until the end. It will be important for you at the end of our session to receive your earnings of the games today.
[Each participant gets the same player number he or she received the last time they participated in the experiments (see namelist).]

[After a person received his/her gamer-tag] Please follow our assistant now to your designated seat. After you have found your seat, we would like to ask you some questions before we begin. We will start our workshop when everybody invited today has arrived at his or her designated seat. Please stay seated until be begin to receive further instructions.

[Participants are assigned a seat according to their player numbers.]
[Participants answer the pre-questionnaire.]

[When all participants have been seated and answered the pre-questionnaire, please proceed]

[Basic instructions]

Thank you all for coming today. My name is XX [NAME OF ASSISTANT MODERATING THE EXPERIMENT] and this is Lukas. In this session today, we want to play some games where you can earn a considerable amount of money that you are permitted to keep and take home. In these games you will have to make decisions that will influence how much you will actually earn. However, irrespective of the outcome of the games, everyone will be given a show-up fee of 100 pesos at the end of our session. [SHOW A 100 PESO BILL] The whole procedure will last around 4 hours. Thank you in advance for your time and effort.
1. You are free to leave whenever you want and no matter whether we have started the session or not. However, when you leave while the workshop is in progress, we will not be able to pay you for participation. **Please tell us now if you already feel uncomfortable or you already know that you will not be able to stay here for at least four hours**.
2. It is very important that you understand the games. Therefore we will check your understanding by asking each of you test questions about the rules. If you do not understand the rules please ask the assistants who are happy to explain them to you. **But if you cannot answer the test questions after we have explained them again, we will have to exclude you from the game and you receive only the show-up fee of 100 pesos**. But don't worry, we will do our best to help you understand the rules of the games!
3. Before you get handed out your money at the end of the workshop, you are asked to answer a questionnaire. It is very important for our research that you **answer all questions seriously**. You will receive your payment only after completing the questionnaire.

After having heard these rules, is there anybody who does not want to participate anymore? [Wait some moments.]

We will play six slightly different games today. In each game you will have to indicate your decisions on a sheet of paper. In each game, you might win or lose some money. How much you earn depends on your decisions, the decisions of others, and luck. However, the 100 pesos you receive in the end will be untouched by the course of the games.

Only one of the six games you are going to play leads to an actual pay-out. At the end of our session, we will randomly draw a ball to determine which of the six games will be used to compute how much is paid out to you. [Show 6 balls with numbers] **The outcome of one game has no influence on the outcomes of the other games. So if you play a new game, don't worry about what happened in the previous games. Just take each game seriously on its own, because it might be the one that determines your pay-out.** In the games you have to make decisions about the allocation of money. Each decision you make may be as good as any other decision – **there are no obviously wrong or right decisions**. Your decisions will not be made public, **so please choose the option YOU like best!** After you played the games and answered the questionnaire at the end, please come to Lukas, who will hand out these earnings plus the show-up fee to you. Remember to sign the receipt for the money.

You already received an ID-tag with a player number printed on it. The player number is your personal identification number for today. You keep this number for all six games of the workshop. Please show the number to Lukas at the end in order to get paid. **So always remember to take the ID-tag with your player number with you.** After we have given you the instructions for the first game of the workshop, we will call you by your player number. Please follow the assistant if you are called.

There are some rules regarding communication. **Talking is strictly prohibited** during the games. You are not allowed to ask questions or talk about the rules of the game to other participants while we are in the process of playing. If you have any questions, please raise your hand and wait until someone comes to answer your question in private. If you do not follow these rules, we have to exclude you from the session, which implies that you do not get any earnings from the games.

1st game (Risk)

Let's start with the first game. In this game you **decide between getting a fixed amount of money and playing a risky lottery which might lead to even more money**. You can only select one of these two options. If you choose the fixed amount of money, you will be paid out the respective sum for certain, at least if this game is later randomly selected as the one determining your winnings. If you decide to play a lottery instead, you might win even more money. However, there is a hook: in the case of bad luck you might get considerably less money.

The lottery looks as follows: We have an opaque bag containing **five red and five white balls**. [SHOW BALLS AND OPAQUE BAG]. At the end of all the games played today, the person sitting in the front row on my right hand side will draw a ball from this bag. If the ball is white, all of you win the higher amount of money from the lottery. If the ball is red, all of you win the lower amount of money from the lottery.

On the decision sheets we will hand out shortly, you will have to decide if you want to play the lottery **or rather receive a fixed sum for sure**. You have to make this decision for more than one case per decision sheet.

Let us show you an example. [SHOW EXAMPLE DECISION SHEET ON POSTER]

Example

Win **200**	○ ○ ○ ○ ○
Win **0**	● ● ● ● ●

Nr.	Option A		Option B
1:	□ Lottery	or	0 for sure □
2:	□ Lottery	or	200 for sure □

In this example, you win 200 pesos if we draw a white ball, whereas you win nothing if we draw a red ball. **You can see the payoff for each event on the left side of the decision sheet**. For visualization, you also see how many red and white balls are in the bag.

You can always decide between two options. **Option A** means that you want to play the lottery. **Option B** means that you will take a certain amount of money instead. Therefore, if you pick Option B, the outcome of the lottery no longer influences your earnings from this game.

In this example, you have to make two decisions. In decision number one you decide between playing the lottery or receiving zero for sure. The second decision is about playing the lottery or receiving 200 pesos for sure. You simply cross the box in each line which you think will be best for you. You can only cross one box per line. There could be more than two decisions to make for each lottery. Note that we randomly choose which decision will be paid out in the end and you will be paid according to your answer. Put differently, if, by chance, this game is selected as the one determining your winnings, we will randomly select the specific decision used to compute your pay-out.

We play three different lotteries today. Remember, only one of these three lotteries will randomly be selected to be paid out at the end of our session today.

Now, to make sure that you understand the game, we would like to go to each one of you now and ask some test questions.

[TEST QUESTIONS: EACH ASSISTANT ASKS INDIVIDUALS OF THE RESPECTIVE GROUP SEPARATELY. PROCEED IF ALL PARTICIPANTS SHOW THAT THEY UNDERSTAND THE GAME AND CAN ANSWER THE FOLLOWING QUESTIONS CORRECTLY]

How much money can you earn in the lottery by drawing a white ball in this example?	[ANSWER: 200]
How much money can you earn in the lottery by drawing a red ball in this example?	[ANSWER: 0]
Look at the first decision to make on this example sheet. What would you earn by choosing option B?	[ANSWER: 0]
Look at the second decision to make on this example sheet. What would you earn by choosing option B?	[ANSWER: 200]

Are there any questions regarding our first game? [WAIT SOME SECONDS AND PROCEED IF ALL QUESTIONS HAVE BEEN ANSWERED; REMOVE POSTER].

We will now distribute the decision sheet for the first of the three lotteries. In this lottery, you can win either 100 pesos if we draw a white ball or 40 pesos if we draw a red ball. On our decision sheet, you have to decide 11 times if you prefer playing the lottery or receiving an amount of money for certain. Please cross the boxes for each decision reflecting what you believe is best for you. When you have made a decision for each line, please put your pencil down. [DISTRIBUTE THE DECISION SHEETS FOR THE FIRST LOTTERY AND COLLECT THE SHEETS WHEN EVERYBODY IS FINISHED WITH CROSSING BOXES]

We will now distribute the decision sheet for the second of the three lotteries. In this lottery, you can win either 200 pesos if we draw a white ball or 80 pesos if we draw a red ball. On our decision sheet, you have to decide 23 times if you prefer playing the lottery or receiving an amount of money for certain. Please cross the boxes for each decision reflecting what you believe is best for you. When you have made a decision for each line, please put your pencil down. [DISTRIBUTE THE DECISION SHEETS FOR THE SECOND LOTTERY AND

COLLECT THE SHEETS WHEN EVERYBODY IS FINISHED WITH CROSSING BOXES]

We will now distribute the decision sheet for the third of the three lotteries. In this lottery, you can win either 200 pesos if we draw a white ball or 140 pesos if we draw a red ball. On our decision sheet, you have to decide 11 times if you prefer playing the lottery or receiving an amount of money for certain. Please cross the boxes for each decision reflecting what you believe is best for you. When you have made a decision for each line, please put your pencil down. [DISTRIBUTE THE DECISION SHEETS FOR THE THIRD LOTTERY AND COLLECT THE SHEETS WHEN EVERYBODY IS FINISHED WITH CROSSING BOXES]

Lottery 1

Win **100**	○ ○ ○ ○ ○
Win **40**	● ● ● ● ●

Nr.	Option A		Option B
1:	□ Lottery	or	45 for sure □
2:	□ Lottery	or	50 for sure □
3:	□ Lottery	or	55 for sure □
4:	□ Lottery	or	60 for sure □
5:	□ Lottery	or	65 for sure □
6:	□ Lottery	or	70 for sure □
7:	□ Lottery	or	75 for sure □
8:	□ Lottery	or	80 for sure □
9:	□ Lottery	or	85 for sure □
10:	□ Lottery	or	90 for sure □
11:	□ Lottery	or	95 for sure □

Lottery 2

Win **200**	○ ○ ○ ○ ○
Win **80**	● ● ● ● ●

Nr.	Option A		Option B
1:	□ Lottery	or	85 for sure □
2:	□ Lottery	or	90 for sure □
3:	□ Lottery	or	95 for sure □
4:	□ Lottery	or	100 for sure □
5:	□ Lottery	or	105 for sure □
6:	□ Lottery	or	110 for sure □
7:	□ Lottery	or	115 for sure □
8:	□ Lottery	or	120 for sure □
9:	□ Lottery	or	125 for sure □
10:	□ Lottery	or	130 for sure □
11:	□ Lottery	or	135 for sure □
12:	□ Lottery	or	140 for sure □
13:	□ Lottery	or	145 for sure □
14:	□ Lottery	or	150 for sure □
15:	□ Lottery	or	155 for sure □
16:	□ Lottery	or	160 for sure □
17:	□ Lottery	or	165 for sure □
18:	□ Lottery	or	170 for sure □
19:	□ Lottery	or	175 for sure □
20:	□ Lottery	or	180 for sure □
21:	□ Lottery	or	185 for sure □
22:	□ Lottery	or	190 for sure □
23:	□ Lottery	or	195 for sure □

Lottery 3

Win **200**	○ ○ ○ ○ ○
Win 1**40**	● ● ● ● ●

Nr.	Option A		Option B
1:	□ Lottery	or	145 for sure □
2:	□ Lottery	or	150 for sure □
3:	□ Lottery	or	155 for sure □
4:	□ Lottery	or	160 for sure □
5:	□ Lottery	or	165 for sure □
6:	□ Lottery	or	170 for sure □
7:	□ Lottery	or	175 for sure □
8:	□ Lottery	or	180 for sure □
9:	□ Lottery	or	185 for sure □
10:	□ Lottery	or	190 for sure □
11:	□ Lottery	or	195 for sure □

2nd Game (soli + beliefs)

Let's start with the second game. All of you have 200 pesos at the beginning of the game. You will make your decisions on a sheet of paper only, but the decisions that you take are still about real money. For the rest of the game we have formed groups, each consisting of 3 players. Each of the originally invited participants [point to the left side where originally invited participants sit] brought along two friends. One sits in the middle and will play with you [point to the middle]. The other one who is sitting on the right-hand side will not be in the same group. Instead, the third player in your group will be someone from the right-hand side of the room, but you will never exactly know who it is. And the ones on the right-hand side will never know the two other group members they play with. From now on we will call the unknown players "Player X".

Whether you can keep the 200 peso given to you or lose them again will depend partly on your choices and partly on your luck. Remember, only one of the games will be randomly selected for the computation of the pay-out at the end of our session. For each group, we now have an opaque bag with 3 balls in it. This means that there are as many balls in the bag as we have players in a group. Each player draws one ball. Out of the 3 balls, there are 2 white balls and 1 red ball. If you draw a white ball you can keep your 200 pesos. If you draw a red ball you lose the 200 pesos you had at the start of the game. This means that one of the three players in each group will lose everything and two out of three will lose nothing.

[Hang up poster with example decision sheet on it]

In this game, the two winners can give money to the loser. Before you draw a ball, all of the players will be asked whether and how much they would like to transfer to the other two players in their group in case that they are unlucky, i.e. they draw a red ball and lose 200 pesos. Remember that one of the three players will lose for sure. Remember also that there will always be two players in your group who still have their 200 pesos. You can transfer between 0 and 70 of your 200 pesos to the unlucky person in your group. We will ask you to write down on a worksheet how much you would be willing to give to the losing player. Amounts are given in steps of 10 pesos. You can also decide to transfer nothing. Hence, possible transfers are 0, 10, 20, 30, 40, 50, 60 or 70. Every transfer decision you make is as good as any other – there are no wrong decisions. Your transfers will be kept in private, **so just choose the amount YOU like best! But remember: it is going to be a transfer of real money.** From now on, we will call the group member you know by his or her name (_____) [ASSISTANTS ENTER THE NAME OF NON-ANONYMOUS PARTNER HERE] and the unknown group member Player X. For the players sitting on the right-hand side [point] there will be two unknown players Player X and Player Y. So imagine you keep your 200 pesos and Player X loses his 200 pesos. We will ask you to write down on the worksheet how much you would be willing to give to Player X in this case (0, 10, 20, 30, 40, 50, 60 or 70). Now imagine you keep your 200 pesos and the friend you came here with and plays with you in your group loses his or her 200 pesos. Please write down on the worksheet how much you would be willing to give to him or her in this case (0, 10, 20, 30, 40, 50, 60 or 70).

We also want you to think about the transfer of the other winner in your group to the loser. Please guess the amounts that will be transferred. You will earn 10 pesos extra for each correct guess.

Lastly, it is, of course, possible that you draw the red ball and lose. We would like you to guess how much your friend in your group and Player X would be willing to give to you in this case. We will never tell you whether you were right or not. But Lukas will look at the choices made by your friend and Player X and compare their choices to your guess. You will earn 10 pesos extra for each correct guess. The best thing you can do to increase your payoff is to truthfully state what you think y and Player X would do.
[SHOW AND EXPLAIN PARTICIPANT FORM *make sure that the player is looking at the form and appears to be sufficiently concentrated*]

For non-anonymous players:

○ no loss	DECIDE TRANSFER TO _____ ●	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
○ no loss	DECIDE TRANSFER TO **PLAYER X** ●	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
● lose 200	GUESS TRANSFER OF _____ ○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
	GUESS TRANSFER OF **PLAYER X** ○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70

For anonymous Players:

○ no loss	DECIDE TRANSFER TO **1st PLAYER X** ●	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
○ no loss	DECIDE TRANSFER TO **2nd PLAYER X** ●	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
● lose 200	GUESS TRANSFER OF **1st PLAYER X** ○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
	GUESS TRANSFER OF **2nd PLAYER X** ○	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70

Before we start playing the game, we would like to ask you some questions to see if you understand the game.

What is the maximum amount of money you can earn in this game?	[ANSWER: 220]
What is the minimum amount of money you can win in this game?	[ANSWER: 0]
What is the highest amount you can transfer to the other player?	[ANSWER: 70]
What is the least amount of money you can transfer to the losing player?	[ANSWER: 0]
How much does the losing player earn, if the other two other players transfer nothing?	[ANSWER: between 0, 10 or 20]

Now we will distribute the decision sheets for the second game.

[Distribbute decision sheets, collect them and bring them to Lukas when every participant is finished with filling them out.]

3rd Game (conditional soli)

Let's turn to the third game. The groups are the same as in the last game and again all of you get 200 pesos at the beginning of the game. The first transfer decision in the game is similar to the one in the game before. The second transfer decision, which we call conditional transfer list, is new. You will have to make two decisions, but you do not know which one is going to be relevant for you in the end.

[Hang up and show poster with decision sheet for third game]

Of the two winners in each group, the first one will give the unconditional transfer to the loser, whereas for the second one, Lukas will use his/her conditional transfer list. In the conditional transfer list, you will choose your transfers conditional on what the loser is willing to give you. Hence, we ask you to decide how much you want to give to the loser **conditional on what he/she decided to transfer to you**. However, since you will not be told how many pesos the loser would be willing to give to you, we ask you to make your decision dependent on all possible transfers the loser could make. However, only the relevant one will be your conditional transfer. [show the following on poster] For example, we might ask you about what you would be willing to give to the loser, knowing that the loser would give 50 pesos to you in case you lost your 200 pesos in this game. In the sheet, we give you some examples and you can pick one of them. But if you don't like the examples and want to react differently to the possible transfers of your group member, just fill out the last column with your own numbers. [explain on **one** poster all decisions that need to be taken by the participant] Each group member will again draw a ball at the end of our session to determine who lost his initial 200 pesos. As before, we have one red ball and two white balls in our opaque bag. The player that draws the red ball is determined as the player that loses his or her 200 pesos.

These were the instructions for the third game. Are there any questions or points that remain unclear and shall be explained in more detail? We would now like to ask you some questions to see if you understand the game [GO TO EACH PLAYER AND ASK TEST QUESTIONS. PROCEED WHEN EVERYBODY UNDERSTANDS THE GAME

What is the maximum amount of money you can make in this game?	[ANSWER: 200]
What is the least amount of money you can make in this game?	[ANSWER: 0]
Between how many options can you choose from in the conditional transfer list? [POINT TO POSTER]	[ANSWER: 5]
Wrong or right? "If I choose the third option in the conditional transfer list, I always transfer nothing to the other player, no matter what he or she decides to transfer to me."	[ANSWER: WRONG]

[When participants show that they have understood the game] We will now distribute the decision sheets for the third game.

[Let participants fill out form separated by screens]
For non-anonymous players:

○ no loss

_____ ○

Player X ●

I TRANSFER TO **Player X**	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
IF **Player X** DECIDED TO GIVE YOU… (CONDITIONAL)				□	□	□	□	□
… 0 DECIDE YOUR TRANSFER				0	70	0	40	___
… 10 DECIDE YOUR TRANSFER				0	70	10	40	___
… 20 DECIDE YOUR TRANSFER				0	70	20	40	___
… 30 DECIDE YOUR TRANSFER				0	70	30	40	___
… 40 DECIDE YOUR TRANSFER				0	70	40	40	___
… 50 DECIDE YOUR TRANSFER				0	70	50	40	___
… 60 DECIDE YOUR TRANSFER				0	70	60	40	___
… 70 DECIDE YOUR TRANSFER				0	70	70	40	___

○ no loss

Player X ○

_____ ●

I TRANSFER TO _____	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
IF _____ DECIDED TO GIVE YOU… (CONDITIONAL)				□	□	□	□	□
… 0 DECIDE YOUR TRANSFER				0	70	0	40	___
… 10 DECIDE YOUR TRANSFER				0	70	10	40	___
… 20 DECIDE YOUR TRANSFER				0	70	20	40	___
… 30 DECIDE YOUR TRANSFER				0	70	30	40	___
… 40 DECIDE YOUR TRANSFER				0	70	40	40	___
… 50 DECIDE YOUR TRANSFER				0	70	50	40	___
… 60 DECIDE YOUR TRANSFER				0	70	60	40	___
… 70 DECIDE YOUR TRANSFER				0	70	70	40	___

[For anonymous players]:

○ no loss

Player X1 ○

Player X2 ●

I TRANSFER TO **Player X2**	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
IF **Player X2** DECIDED TO GIVE YOU… (CONDITIONAL)				□	□	□	□	□
… 0 DECIDE YOUR TRANSFER				0	70	0	40	___
… 10 DECIDE YOUR TRANSFER				0	70	10	40	___
… 20 DECIDE YOUR TRANSFER				0	70	20	40	___
… 30 DECIDE YOUR TRANSFER				0	70	30	40	___
… 40 DECIDE YOUR TRANSFER				0	70	40	40	___
… 50 DECIDE YOUR TRANSFER				0	70	50	40	___
… 60 DECIDE YOUR TRANSFER				0	70	60	40	___
… 70 DECIDE YOUR TRANSFER				0	70	70	40	___

○ no loss

Player X2 ○

Player X1 ●

I TRANSFER TO **Player X1**	□ 0	□ 10	□ 20	□ 30	□ 40	□ 50	□ 60	□ 70
IF **Player X1** DECIDED TO GIVE YOU… (CONDITIONAL)				□	□	□	□	□
… 0 DECIDE YOUR TRANSFER				0	70	0	40	___
… 10 DECIDE YOUR TRANSFER				0	70	10	40	___
… 20 DECIDE YOUR TRANSFER				0	70	20	40	___
… 30 DECIDE YOUR TRANSFER				0	70	30	40	___
… 40 DECIDE YOUR TRANSFER				0	70	40	40	___
… 50 DECIDE YOUR TRANSFER				0	70	50	40	___
… 60 DECIDE YOUR TRANSFER				0	70	60	40	___
… 70 DECIDE YOUR TRANSFER				0	70	70	40	___

4th game (soli + shock)

####... control group

####... treated group

We will now start with the fourth game. It is the very same as the second game, which we played before.

[Hang up Poster with decision sheet of second game again]

Everyone starts with 200 pesos in the beginning. Again, we have a bag with two white balls and one red ball in it. Each member of a group of three people will draw a ball from this bag. The player that draws the red ball, loses 200 pesos.

We would ask you again to decide your transfer if your friend draws the red ball and your transfer if Player X draws the red ball. We would also like you to guess how much they would transfer to you, if you draw the red ball. You will receive 10 pesos extra for each correct guess.

Are there any questions regarding the fourth game? [WAIT SOME SECONDS AND ANSWER QUESTIONS]

Now we would like to ask you some questions to see if you understand the game.

What is the maximum amount of money you can earn in this game?	[ANSWER: 220]
What is the minimum amount of money you can win in this game?	[ANSWER: 0]
What is the highest amount you can transfer to the other player?	[ANSWER: 70]
What is the least amount of money you can transfer to the losing player?	[ANSWER: 0]
How much does the losing player earn, if the other two other players transfer nothing?	[ANSWER: between 0, 10 or 20]

[PROCEED WHEN PARTICIPANTS SHOW THAT THEY HAVE UNDERSTOOD THE GAME]

We now distribute the decision sheets for the fourth game.

The fourth game is similar to the second game that we played earlier. But this time, the group of three persons starts with a total amount of 400 pesos. However, there is a two-thirds chance, i.e. two out of three times, of losing 200 pesos of this initial amount. Whether the group can keep the 400 pesos for the rest of the game is decided by drawing balls from the opaque bag. This time, there are two red balls and one white ball in the bag. I will now go to each group of three people and the person sitting on the far left side draws a ball for the whole group. If this person draws a red ball, the group loses 200 pesos and starts with 200 pesos

instead of 400 pesos. If, instead, this person draws a white ball, the group starts with 400 pesos. After this procedure, some groups will commence the actual game with 400 pesos and others with 200 pesos. Each group has the same chance of losing the 200 pesos in the beginning, as I always put the ball back into the bag. Note that I cannot influence the outcome of the draw. We will now begin drawing balls for each group.

[GO TO EACH GROUP AND DRAW A BALL VISIBLY FOR ALL GROUP MEMBERS. MAKE SURE THEY REALIZE THAT THE DRAW WAS CONDUCTED IN A FAIR WAY. REAPEAT THIS PROCEDURE FOR ALL GROUPS OF THREE PEOPLE IN THE ROOM. GIVE NON-ANONYMOUS PLAYERS A RED PIECE OF PAPER SO THAT THEY REMBER THAT THEY START THE GAME WITH 200 PESOS. A WHITE PEACE OF PAPER INDICATES THAT THEY START THE GAME WITH 400. ANONYMOUS PLAYERS DO NOT RECEIVE A PIECE OF PAPER, SINCE THEY DO NOT KNOW WITH HOW MUCH MONEY THEY START THE GAME.]

Now that we have finished drawing balls from the bag, there are some groups that start with 400 pesos in this game, and some that start with 200 pesos. There is one thing to mention. The anonymous players do not know in what group they are. [point to left-hand side where anonymous players sit] Therefore they also do not know if they start the game with 200 or with 400 pesos. We now continue like in the second game.

[Hang up Poster with decision sheet of second game again]

Again, we have a bag with two white balls and one red ball in it. Each member of a group of three people will draw a ball from this bag. The player that draws the red ball, will lose 200 pesos. So, when you start with 200 pesos in this game and draw a red ball, you begin with zero pesos. When you started with 400 pesos and draw a red ball, you commence with 200 pesos. We would ask you again to decide your transfer if your friend draws the red ball and your transfer if Player X draws the red ball. We would also like you to guess how much they would transfer to you, if you draw the red ball. You will receive 10 pesos extra for each correct guess.

Are there any questions regarding the fourth game? [WAIT SOME SECONDS AND ANSWER QUESTIONS]

Now we would like to ask you some questions to see if you understand the game.

What is the maximum amount of money you can earn in this game?	[ANSWER: 220 if group drew red ball, 420 if group drew white ball]
What is the minimum amount of money you can win in this game?	[ANSWER: 0 if group drew red ball, 200 if group drew white ball]
What is the highest amount you can transfer to the other player?	[ANSWER: 70]
What is the least amount of money you can transfer to the losing player?	[ANSWER: 0]
How much does the losing player earn, if the other two other players transfer nothing?	[ANSWER: between 0, 10 or 20 if red ball, 200, 210 or 220 if group drew white ball]

[PROCEED WHEN PARTICIPANTS SHOW THAT THEY HAVE UNDERSTOOD THE GAME]

We now distribute the decision sheets for the fourth game.

[Priming Stage]

Now our Assistants will come to you to conduct a short questionnaire.

[Priming will be randomly assigned at group level (groups of three people) and involves conducting a short survey. We have three questionnaires: positive priming, negative priming and neutral priming.]

5th game (primed soli + beliefs)

We will now start with the fifth game. It is the very same as the second game, which we played before.

[Hang up Poster with decision sheet of second game again]

Everyone starts with 200 pesos in the beginning. Again, we have a bag with two white balls and one red ball in it. Each member of a group of three people will draw a ball from this bag. The player that draws the red ball, loses 200 pesos.

We would ask you again to decide your transfer if your friend draws the red ball and your transfer if Player X draws the red ball. We would also like you to guess how much they would transfer to you, if you draw the red ball. You will receive 10 pesos extra for each correct guess.

Are there any questions regarding the fourth game? [WAIT SOME SECONDS AND ANSWER QUESTIONS]

Now we would like to ask you some questions to see if you understand the game.

What is the maximum amount of money you can earn in this game?	[ANSWER: 220]
What is the minimum amount of money you can win in this game?	[ANSWER: 0]
What is the highest amount you can transfer to the other player?	[ANSWER: 70]
What is the least amount of money you can transfer to the losing player?	[ANSWER: 0]
How much does the losing player earn, if the other two other players transfer nothing?	[ANSWER: between 0, 10 or 20]

[PROCEED WHEN PARTICIPANTS SHOW THAT THEY HAVE UNDERSTOOD THE GAME]

We now distribute the decision sheets for the fifth game.

6th game (primed spite)

In this game, you are no longer in the same groups you were before. Now you will be playing with a random participant from this room, **but not one of your friends you came here with initially**. In this game, you will be called Player A and the other player will be called player B.

[EXPLAIN AND SHOW WITH HELP OF DECISION SHEET ON POSTER]

Which option do you prefer?			
I want to choose…	**Option 1** □	**Option 2** □	**Option 3** □
which reduces Player B's income by:	0	40	160
which costs me:	0	10	40
According to your opinion, what option does the other player pick?	**Option 1** □	**Option 2** □	**Option 3** □

You and Player B both receive 200 pesos in the beginning. In this game, you can decide to reduce Player B's income or not. The reduction of player B's income will cost one peso per four peso you want to reduce his or her money. This time you can decide between three options, 1, 2 and 3. You can either reduce Player B's income by zero pesos at the cost of zero pesos (Option 1), reduce Player B's income by 40 pesos at the cost of 10 pesos (Option 2) or reduce Player B's income by 160 pesos at the cost of 40 pesos (Option 3). Remember that both of you make the same type of decision and thereby influence each other's income. For example, if both of you choose Option 1, both of you will earn 200 pesos in this game. If both of you choose Option 2, both of you get 150 pesos in this game (because each player has to pay 10 pesos, minus the reduced income of 40 pesos). If both of you choose Option 3, both of you will get no money from this game (because each player has to pay 40, minus the income reduction by 160). You do not know Player B's decision and Player B does not know yours.

It is very important to keep in mind that the decisions are absolutely private and that your decision will not be shown to anybody else.

We would also like to ask you what you believe which option the other player picks. If you guess correctly, you will receive 10 pesos.
Before we hand out the decision sheets, we would like to ask you some questions to see if you have understood the game.

[TEST QUESTIONS: EACH ASSISTANT ASKS MEMBERS OF THE RESPECTIVE GROUP SEPARATELY. PROCEED IF ALL PARTICIPANTS SHOW THAT THEY UNDERSTAND THE GAME AND CAN ANSWER THE FOLLOWING QUESTIONS CORRECTLY]

How much do you have to pay in **option 1**?	[ANSWER: 0]
How much does the other player lose if you choose **option 1**?	[ANSWER: 0]
How much do you lose, if your co-player chooses **option 2**?	[ANSWER: 40]
How much do both players get from this game, if both choose **option 3**?	[ANSWER: 0]
How much do you receive for guessing the other persons decision correctly?	[ANSWER: 10]

Randomization of show-up fee

We have now finished with our games for today. Now we would like to give you a present. As you may recall, you receive 100 pesos for showing up today, regardless of your decisions in the games. We would like to increase this show-up fee. However, the size of the increase is determined by a random generator. You can get an additional amount between 0 and 50 pesos in steps of ten. This means that your show up fee is going to be somewhere between 100 pesos and 150 pesos.

Survey and pay-out

We will now determine the games that we will use to compute the money that you will get. Therefore, we draw balls from the opaque bag again. The balls have numbers from 1 to 6 on them. The number we draw determines which game is relevant for your earnings today. [SHOW BAG AND BALLS AND DRAW BALLS VISIBLE TO EVERYBODY]

[IF GAME ONE IS DETERMINED TO BE PAID OUT]
We will now determine which of the three lotteries will be paid out. Therefore, we use our opaque bag again and balls with numbers from 1 to 3 on them [SHOW BALLS AND BAG AGAIN AND DRAW]. Now we will determine, which of the decisions you made regarding this lottery will be used to determine the pay-out. We use a random generator that selects the relevant line of the lottery choices. [USE RANDOM GENERATOR TO DETERMINE RELEVANT LINE]

[IF GAME 2-5 IS DETERMINED TO BE PAID OUT]
We will now determine the losing player of each group. Our assistants will go to each group and let every participant draw one ball from the opaque bag. The person that draws a red ball, is determined to be the one that loses 200 pesos. Remember, there are two white balls, and one red ball in the bag. [SHOW BALLS AND PUT THEM IN THE BAG]. We will now start drawing balls from the bag.

Now we would like to conduct a survey with you. [Assistants conduct surveys individually]

We will now give you your earnings. Please stay seated for now and wait until your player number is called, then come to see Lukas at the front of the room. Please take your tag with the player number on it with you and give it back to us. Make sure that you take all your belongings with you when you depart from the room.

[Call each participant separately to the front to receive winning. Let participant sign a receipt and put the receipt somewhere safe. Put the money in an envelope, close it, and hand it to the participant. Make sure the participants leave the area and do not witness the pay-off given to other participants.]
[Thank everyone and say goodbye]

A12 Focus group discussion protocol

- Focus Group Discussion –

(approx. 2.5 hours)

For the assistants:

***Text in red*: Instructions for the assistants, not to be read out loud**

Text in black: To be read out loud to the participants

***Text in green*: Title of PRA Tool**

[Focus group

In total, 9 people attend this workshop. At the beginning, 3 groups are formed, each consisting of 3 randomly chosen individuals from specific social groups:

- 3 fishers
- 3 shop owners
- 3 individuals (randomly chosen residents, except kagawads)

The participants answer the pre-questionnaire at the beginning (approx. 5 min)]

[When participants arrive: Before the welcoming, each assistant should assign a player number to her participants (fishers: 1-3, shop owners: 4-6, randomly chosen participants: 7-9)]

Hello and thank you for coming. Before we start with our workshop for today, I would like to give you your personal gamer tag [ID-card]. Please keep this tag always with you until the end. It will be important for you at the end of our session to receive your earnings today.

[Please ask each participant whether he or she is a fisher, shop owner or not.]

[Each participant gets the player number.]

[After a person received his/her gamer-tag]

Please follow our assistant now to your designated seat. We will start our workshop when everybody invited today has arrived at his or her designated seat. Please stay seated until be begin to receive further instructions.

[Participants are assigned a seat according to their player numbers.]

Basic Instructions

Thank you all for coming today. My name is […]

In this workshop today, we would like to ***learn from you and also learn with*** you about various topics that come along with natural disasters.

We are, particularly, interested in what changed for you and your Barangay after typhoon Yolanda hit the island in 2013. Changes might be related to your livelihood, income or relationships with others in your Barangay. We also would like to get your perspective on how

you perceive help coming from outside as well as how you – as a community – dealt with the destruction.

We are excited to learn from your experience and hope to encourage some discussions among the group. In any case, we depend on your active participation in order to gain insight. Each of you will be given a show-up fee of 100 Pesos at the end for sure. [Show a 100 Peso bill.]

In the first part you will have to make your own decisions and thereby, work on your own. Here, you can earn an additional amount of money that you are permitted to keep and take home. Whereas, in the following parts, you will work in groups and therefore, share your opinion and experiences with others.

The whole discussion will last around 3 hours. Thank you in advance for your effort and time.

1. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the discussion or not. **But if you feel uncomfortable already now, or you already know that you will not be able to stay for the two to three hours, then you should tell us now**.

2. It is very important that you understand the questions and tools that will be applied. Therefore, at some points, we will present some exemplary questions to explain the tools. If you do not understand the tools you may always ask the assistants to explain them. Don't worry, we will try to explain all questions as easy and understandable as possible.

3. You get handed out your money at the end of the workshop. It is very important for our research, that you answer **all questions seriously**. You will receive your payment only after completing all tasks and questions.

4. **WHAT IS SAID IN THIS ROOM STAYS HERE.** The information you will give us is strictly confidential and no one will bother you in any way about what you say concerning the questions we ask you.

5. Everything that is said in this group, will be recorded. However, we will not track what is said by which person, but rather we are only interested in the content.

After knowing these rules, is there anybody who does not like to participate anymore?

[Wait some moments]

We would like to start with a brief questionnaire. Please wait while the assistants will come to you one after another.

[Use the paper questionnaires to conduct the pre-questionnaires titled "A. PRE-QUESTIONNAIRE | Part I – General Information" – approx. 5 minutes/person]

- A. PRE-QUESTIONNAIRE (separately) -

Date: _____ Barangay: _____

ID Number: _____ Name: _____

	Please fill in here
Age	
Sex (0=M, 1=F)	
Educational attainment (1=Elementary, 2=High School, 3=Vocational Training, 4=College, 5=Master's Degree)	

Do you personally receive a regular income? (0=No, 1=Yes)			
Income sources			
Name of income source	Average income **per month**	Income in a **good month**	Income in a **bad month**
Main occupation			
1.			
Additional occupation			
2.			
3. Fishery			
4.			
Do you have other sources of income?			
5.			
6. Remittances (household)			

On average, how much does your **household** earn per month? (PhP)	
Household Head (1=Head, 2 = Spouse)	
Current Marital Status (1=Single, 2=Married; 3=Separated, 4=Widowed)	

How many people stay permanently (more than 6 months per year) in your household?		
How many people in **<u>your household</u>** are…	…0-6 years old?	
	…7-12 years old?	
	…13-17 years old?	
	…18-60 years old?	
	…>60 years old?	
Number of years living in this Barangay?		
In the last month, did anybody in the household reduce meals because there was not enough money for food? (0=No, 1=Yes; if yes, how often?)		
Do you have savings of more than 1000 pesos? (0=No, 1=Yes)		
Do you have savings of more than 5000 pesos? (0=No, 1=Yes)		
Do you owe money, labour or something else to somebody with a total value higher than 5000 Pesos? (0=No, 1=Yes)		
If yes, whom do you owe mainly? (1=to a bank/microfinance/money lender, 2=friend, 3=relatives, 9=other, n.a.= not applicable)		

01 How strongly was your household affected by the typhoon Yolanda? Please determine the degree, to which your home was destroyed or your personal livelihood was destructed, on a scale from one to seven, where one means “not affected at all” and seven means “extremely affected”.

Disaster Loss	**1** **Not affected at all w/ no damage**	**2** **Negligible damages** (e.g. to house, crops, etc.)	**3** **Minor damages** (e.g. to house, crops, etc.)	**4** **Moderate damage** (e.g. house partly desroyed, crops, etc.)	**5** **Severe damage** (e.g. house partly desroyed, crops, income source partly lost, etc.)	**6** **Devastating damage** (e.g. significant damage to house, injured, income source completely lost, etc.)	**7** **Extremely affected w/ incredible damage** (i.e. complete destruction of house, income source, casualties, etc.)
Your household	☐	☐	☐	☐	☐	☐	☐

02 Would you say that your household was rather more or less affected by the typhoon than most other households in your Barangay?

- □ More
- □ Same
- □ Less

03 Following the destruction caused by the typhoon Haiyan/Yolanda, how much support did you receive by others? Please tell us about the degree of support you got from neighbours and friends on the one hand and relief organisations and public authorities on the other hand? Please determine the degree on a scale from one to seven, where one means “not supported at all” and seven means “significantly supported”.

Support	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Help received by neighbours and friends	☐	☐	☐	☐	☐	☐	☐
Help received by organisations/authorities	☐	☐	☐	☐	☐	☐	☐

04 When comparing your situation with that of others in your Barangay, do you believe that you have you received more, less or the same amount of aid?

- □ More
- □ Same
- □ Less

05 Please list all groups or organizations, committees, councils, associations, cooperatives to which you belong. These could be formally organized groups or just groups of people who get together regularly to do an activity or talk about things.

Name of the group:	**Type of group (1=women group, 2=farmer/fisher association, 3=governmental, 4=…)**	**Do you have a leading position in this group? If yes, which one? (if yes = note position; if no = n/a)**	**How often per year do meetings take place?**	**How often per year do you go to the meetings**	**Do you pay a membership fee? (if yes = note monthly amount; if no = n/a)**	**How many hours per week do you engage in activities of this group?**

Part I – Social norms

[1st Decision Tool]

In the following part, you can earn **a bonus of PHP 50** in addition to your show-up fee which depends on the decisions you make now. There will be four main questions in this part. At the end, only the answer to one of these questions will be paid out. The question will be randomly chosen and checked for its correctness. Based on your performance in this random question, you are generally able to receive the **additional** payment [show PHP 50].

In case you have questions at any point in time, please raise your hand and wait until someone comes to answer your question in private. Please **do not talk, exclaim, or try to communicate** with other participants during the experiment. Participants intentionally violating the rules may be asked to leave the experiment and may not be paid.

At the moment, another group in this Barangay is participating in some experimental games. In each game they need to make decisions. In each game they might win or lose some money. Let me explain the experimental games to you.

[Solidarity Game]

[Present the solidarity game by using a bag with 2 white balls and one red ball inside]

AT THE SAME TIME, PLEASE READ OUT THE FOLLOWING INSTRUCTIONS]

In order to play the game, each of the participants receives PHP 200 [show 200 PHP] at the beginning. For the rest of the game, there are always groups of 3 players.

They have a bag with 3 balls in it. This means that there are as many balls in the bag as we have players in a group. Each player will have to draw one ball. Out of the 3 balls there are 2 white and 1 red ball.

[Show the balls inside the bag one after another and show the illustration of the three players participating in the game.]

If a person draws a white ball [show white ball], he or she can keep the PHP 200. If a person draws a red ball [show red ball], he or she loses all PHP 200. That means that one of the three players in each group will lose everything and two out of three will not lose.

[DISTRIBUTE THE DECISION SHEETS titled “Part I – Social norms | 1st GAME” FOR THE FIRST SESSION AND COLLECT AFTER EVERYONE FINISHED WITH CROSSING THE BOXES]

[Jacqueline, Carla, Razel: Please make sure that each participants filled in his player number! Make sure that all columns and lines are filled out.]

In this game the two players who could keep their PHP 200 can transfer some money to the loser. **Before the participants even know which ball they draw, they are firstly asked whether and how much they would like to send to the loser of their group.** Each of the three has to decide to transfer between 0 and 70 of his or her PHP 200 to the loser. Amounts are in steps of PHP 10. So transfers are 0, 10, 20, 30, 40, 50, 60 or 70. They make the decision on a decision sheet.

Each of the player states which amount he wants to transfer to the others at the beginning **before they know who will lose**. In the end, the loser will **or** will not receive a transfer from

both winning players. These transfers are anonymous and will be kept confidential throughout the whole game.

If all players decide to transfer zero peso to the others, the loser will end up with zero peso, whilst the others can keep the initial PHP 200. However, if all players decide to transfer the maximum amount of PHP 70 to the others, the loser will end up with PHP 140 in total. Each of the winning player can keep the remaining amount of PHP 130. It could also be that both winning player have decided to give different amounts to the loser.

Now we want **you to make a guess**! Imagine the situation in the experiment that **currently** takes place **in this Barangay**. What do you believe most of the other participants decide to transfer to an **unknown** player who lost his PHP 200? **Remember it is real money.** For this question, please only look at the left hand side of the table in your decision sheet.

*[*SHOW WITH HELP OF DECISION SHEET ON POSTER – Point on column on the left hand side of the table*]*

- First, please state what most of the normal Barangay residents would transfer to an unknown player.
- What would Barangay Council Officials transfer to an unknown player.
- What would a candidate that run for office in 2013 without being elected, transfer?
- What would people that were heavily affected by the typhoon Yolanda transfer? Heavily affected means that their home and property were completely destroyed.
- What would people decide to transfer if they were heavily affected by the typhoon Yolanda and if they received help by other neighbours and friends. This help can be related to reconstruction assistance and sharing of relief goods within the community.
- What would people decide to transfer if they were heavily affected and if they received humanitarian aid by any organisation in the aftermath of the typhoon Yolanda. This help coming from outside the community can be related to financial and reconstruction assistance and the distribution of relief goods.

In case you guess correctly what the participants in the other experiment have decided to transfer, you receive an additional amount of PHP 50. Of course your guess can be wrong, in case it is PHP 10 higher or lower than the amount most people actually decided to transfer in the game, you will still receive an additional payoff of PHP 30 instead of PHP 50. In case the respective Barangay residents are not present in the experiment, another sub-game will be randomly chosen.

[Wait some minutes until all participants filled out the left side of the table. After everyone finished, inform the moderator and continue:]

*[*SHOW WITH HELP OF DECISION SHEET ON POSTER*]*

Now we would like to move to the right hand side of the table in your decision sheet.

In this step, we would like you to state the amount you would have expected the participants to transfer to an unknown player **from a socially correct perspective**. A socially correct choice is consistent with moral or proper social behaviour. Most people agree that this is the "correct" or "ethical" thing to do. For example, in case of a socially inappropriate choice, most of the other participants might be angry. Your payoff now depends on the actual option most of the people **in this room** choose to be socially the most appropriate one. So to put it in other words: this figure **does not necessarily** represent what the participants **actually** decided to transfer but rather what they should have transferred, namely the option you consider to be the socially most appropriate one in your Barangay. Just imagine you find a wallet on a table.

You need to decide what to do. Are you taking the wallet? Ask others nearby if it belongs to them or leave it where it is. What would be morally correct to do?

Just take each question seriously on its own, because it might be the one that is paid out. The best thing you can do is to increase your payoff by PHP 50 is to truthfully state what you think most of the people in this Barangay would do or what you would have expected them to do from a socially correct perspective.

Your decisions will be kept in private, **so just choose the option YOU think is the one actually chosen by most of the people!**

[Assistants will EXPLAIN PARTICIPANT FORM – if necessary, *make sure that the player is looking, seeing, and concentrating]*

[wait approx. 10 minutes]

[DISTRIBUTE THE DECISION SHEETS titled "Part I – Social norms | 2nd GAME" FOR THE FIRST SESSION AND COLLECT AFTER EVERYONE FINISHED WITH CROSSING THE BOXES]

[Please make sure that each participants filled in his player number! Make sure that all columns and lines are filled out.]

[Spite Game]

[Present the Spite Game by showing the illustration of the two players participating in the game - each with a total amount of 200 PHP.]

Now, we will turn to another game the others are currently playing.

In this game, the participants are no longer in the group they have been playing previously. Now each of the participants does not know with whom he or she will be playing. Each of them has to make a decision on a decision sheet.

Both receive 200 PHP in the beginning. In this game, they can decide to reduce **or not** to reduce the money of the other unknown player. However, the reduction of the other player´s income will cost them some money.

[EXPLAIN AND SHOW WITH HELP OF TABLE THAT ILLUSTRATES THE OPTIONS]

The participants can decide between three options, 1, 2 or 3, where they can either reduce the other player's income by zero PHP at the cost of zero PHP (Option 1), reduce the other player's income by 40 PHP at the cost of 10 PHP (Option 2) or reduce the other player's income by 160 PHP at the cost of 40 PHP (Option 3).

They take their decisions at the same time. In any case, the decisions are anonymous and will be kept confidential throughout the whole game.

Remember that both make decisions which influence each other's income respectively. For example:

[EXPLAIN AND SHOW THE PAYOUT MATRIX ON DECISION SHEET]

If **most of the participants choose Option 1:** The unknown players, they are playing with earn 200 PHP but only if most of the unknown players choose Option 1 as well. The payoff for both remains PHP 200. Yet, the participants do not know which option their unknown partner might choose **at the same time**.

So let's pick out one example: if a participant chooses Option 1 and the unknown co-player chooses Option 2, the participant will receive a payoff of 160 PHP, while the unknown player's payoff will be reduced at the cost of PHP 10 to PHP 190.

In case a participant chooses Option 1 and the unknown co-player chooses Option 3, the participants will receive a payoff of 40 PHP while the unknown player's payoff will be reduced at the cost of PHP 40 to PHP 160.

If **most of the participants choose Option 2:** This option costs the participants PHP 10 but with that they can reduce the unknown co-players' income by PHP 40. So, for instance, in case the unknown co-player decides – at the same time – **not** to reduce the participant's income by choosing Option 1, the unknown co-player ends up with PHP 160 and the participant with PHP 190.

In case both Players – at the same time – choose Option 2, it both costs them PHP 10 but it reduces the other Player´s income by PHP 40. So both end up with PHP 150.

As far as a participant chooses Option 2, while the unknown co-player chooses Option 3: the participant's income will be reduced by PHP 160 and he or she will receive a payoff of 30 PHP. At the same time, the co-player's payoff will be reduced by PHP 80 to PHP 120.

If **most of the participants choose Option 3,** it costs them PHP 40, but with that they decide to reduce their co-player´s income by PHP 160. So how do both Players end up in the case, where the unknown co-player chooses Option 1? The unknown co-player's payoff will be reduced to 40 PHP, while the participant will earn PHP 160. If the unknown co-player chooses Option 2 instead, it costs him/her PHP 10 but it reduces the other Player´s income by PHP 40. So the unknown co-player will end up with a payoff of PHP 30 and the participant's income will be reduced to PHP 120.

In case both Players choose Option 3, they decide to reduce the other Player´s income by PHP 160, which costs both of them PHP 40. The payoff for both is PHP zero then.

*[*SHOW WITH HELP OF DECISION SHEET ON POSTER*]*

Now, again, we want **you to make a guess**! Imagine the situation in the experiment that **currently** takes place **in this Barangay**.

For this question, please only look at the left hand side of the table in your decision sheet. What do you believe most of the participants decide to do?

- Please state which option most of the normal Barangay residents would choose in order to reduce or not reduce another unknown player's income.
- Which option would Barangay Council Officials choose.
- Which option would a candidate that run for office in 2013 without being elected, choose?
- Which option would people that were heavily affected by the typhoon Yolanda choose? Heavily affected means that their home and property were completely destroyed.
- Which option would people choose if they were heavily affected by the typhoon Yolanda and if they received help by other neighbours and friends. This help can be related to reconstruction assistance and sharing of relief goods within the community.
- Which option would people choose if they were heavily affected and if they received humanitarian aid by any organisation in the aftermath of the typhoon Yolanda. This help coming from outside the community can be related to financial and reconstruction assistance and the distribution of relief goods.

Remember, you can gain an additional payout of 50 PHP, which will depend on whether or not your choice is consistent with the answers given by the participants in the other experiment.

[wait some minutes until all participants filled out the left side of the table. After everyone finished, inform the moderator and continue:]

*[*SHOW WITH HELP OF DECISION SHEET ON POSTER*]*

Now we would like to move to the right hand side of the table in your decision sheet.

We would like you to state the option you would have expected most of the participants to choose instead – **now from a socially correct perspective**. Your payoff now depends on the actual option most of the participants **in this room** choose to be socially the most appropriate one.

Please, once again, take each question seriously on its own, because it might be the one that is paid out. The best thing you can do to increase your payoff by PHP 50 is to truthfully state what you think most people in this Barangay would do or what you would have expected them to do from a socially correct perspective.

In any case, your decisions will be kept in private.

[EXPLAIN PARTICIPANT FORM – if necessary]

[COLLECT AFTER EVERYONE FINISHED CROSSING THE BOXES]

One final remark for your interest concerning the payout **here**:

After you answered your questionnaire and participated in the discussions, we will need some time to check your answers in the questionnaire. Later this afternoon, you can come one by one to our colleague Lukas, who will hand out the show-up fee and the additional earnings, if any, and you sign the receipt.

[PLEASE DRAW A BALL TO CHOOSE WHICH GAME WILL BE RANDOMLY SELECTED]

ID Number: _____ Barangay: _____ Date: _____

1st GAME

The participants receive PHP 200 at the beginning of the game.

The table below gives a list of the possible choices available to the participants in the experiment. They can decide to transfer one of the following amounts as a share of their initial endowment to an unknown player in their group.

decision to transfer	PHP 0	PHP 10	PHP 20	PHP 30	PHP 40	PHP 50	PHP 60	PHP 70

WHAT WOULD MOST OF THE PARTICIPANTS DECIDE TO TRANSFER IF THEY ARE...	Guess of **actual** choice in the game (in PHP) ☺ → ☹	**Morally correct** choice (in PHP) ☺ → ☹
☺○ normal Barangay residents		
☺○ Barangay Council Officials		
☺○ candidates who run for office in past elections in 2013 but became **not** elected		
☺○ people heavily affected by typhoon Yolanda (home and property completely destroyed)		
☺○ people heavily affected by typhoon Yolanda and who received aid by others, friends, family, neighbours, in the Barangay (sharing relief goods and assistance with reconstruction within the community)		
☺○ people heavily affected by typhoon Yolanda and who received humanitarian aid by any organisation (distribution of relief goods, financial and reconstruction assistance from outside the community)		

2nd GAME [page in support of assistants only if further questions arise]

Both players receive 200 PHP in the beginning. In this game, they can decide to reduce **or not** to reduce the money of the other co-player. However, the reduction of the other co-player´s income will cost him or her some money.

Participants and their co-player can decide between three options, 1, 2 or 3, where he or she can either reduce the other player's income by zero PHP at the cost of zero PHP (Option 1), reduce other player's income by 40 PHP at the cost of 10 PHP (Option 2) or reduce other player's income by 160 PHP at the cost of 40 PHP (Option 3). **They take their decisions at the same time.**

The participants choose…	Option 1 □	Option 2 □	Option 3 □
which costs them:	0 PHP	10 PHP	40 PHP
which reduces the other co-player's income by:	0 PHP	40 PHP	160 PHP

Depending on the option each of them decide to make, the matrix shows you the payoffs for each player. The payoffs for the participant are marked in green, the ones for its unknown co-player in blue.

What role does the government play in the development of an MPA if it is community-based?

Example:

If both, the participant and its unknown co-player, decided not to reduce the other player´s income, each end up with a payoff of 200 PHP. If the participant decides to reduce its unknown co-player´s income by 40 PHP, this option 2 costs him/her 10 PHP. If at the same time, the unknown co-player decides to reduce the participant´s income by 160 PHP, this option 3 costs him/her 40 PHP. So the participant ends up with 30 PHP and the unknown co-player with 120 PHP. Kindly note that this was only an example.

ID Number: _____ Barangay: _____ Date: _____

2nd GAME

Both players receive 200 PHP in the beginning. In this game, they can decide to reduce **or not** to reduce the money of the other co-player. However, the reduction of the other co-player´s income will cost him or her some money. **They take their decisions at the same time.**

The participants choose…	Option 1 □	Option 2 □	Option 3 □
which costs them:	0 PHP	10 PHP	40 PHP
which reduces the other co-player's income by:	0 PHP	40 PHP	160 PHP

WHICH OPTION WOULD MOST OF THE PARTICIPANTS DECIDE TO CHOOSE IF THEY ARE...	Guess of **actual** choice in the game (Option 1, 2 or 3)	**Morally correct** choice (Option 1, 2 or 3)
normal Barangay residents		
Barangay Council Officials		
candidates who run for office in past elections in 2013 but became **not** elected		
people person heavily affected by typhoon Yolanda (home and property completely destroyed)		
people heavily affected by typhoon Yolanda and who received aid by others, friends, family, neighbours, in the Barangay (sharing relief goods and assistance with reconstruction within the community)		
people heavily affected by typhoon Yolanda and who received humanitarian aid by any organisation (distribution of relief goods, financial and reconstruction assistance from outside the community)		

- B. PRA Tools –

Time Line

Now, we want to introduce the first discussion tool. Therefore, we would like to start with a small and simple example to illustrate how the tool actually works.

Some of you might love CHICKEN ADOBO a lot. What is your usual lunch, dinner and breakfast time? [Wait a moment – mark “lunch”, “dinner” and “breakfast” in the timeline of the diagram]

Now please remember yesterday and describe on a scale from “minus three” to “plus three” how much you would have liked to eat a chicken adobo at a point in time. Here, “zero” means “your hunger for a chicken adobo at 12 pm”, “minus three” means “not hungry for chicken adobo compared to 12 pm” and “plus three” means “very hungry for chicken adobo compared to 12 pm”. Please sketch in the development of your appetite during the past day.

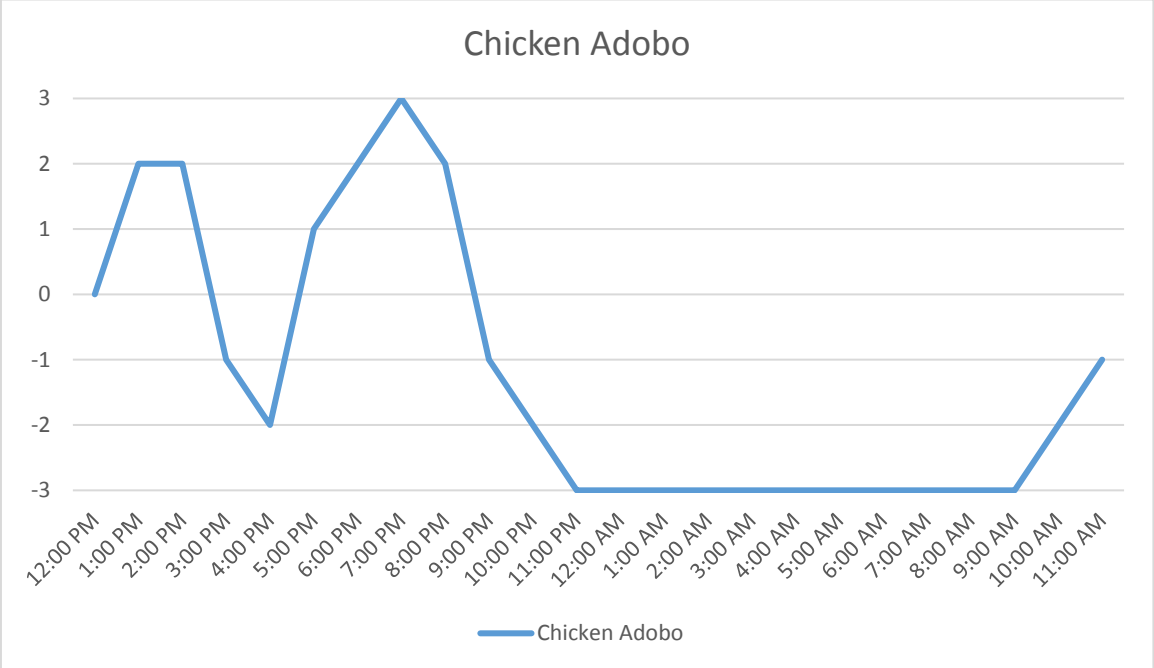
At what time yesterday did you feel like having or **not** having a chicken adobo relative to your hunger at 12 pm? [Wait a moment]

[Participants answer]

Let us draw it in the graph.

[Ask for their hunger at different points of time first.

After they discussed and finally agreed on one rating: Please draw the line in the diagram]



[assistants should assist the participants if necessary.

One final remark: The sketching can be different. E.g. if thde person ate before 12 pm: the reference point would be not so hungry such that the line might be rather dropping. If person has not eaten yet at 12 pm: the line might be rather rising, as the person is getting hungry]

Let's move to the real question now.

Therefore, we will form 3 groups, each consisting of 3 individuals. The first group consists of 3 fishers, the second of 3 shop owners and the third of 3 further randomly chosen residents in this Barangay. [help them forming the groups]

Please discuss and work together with your group. [Point again at the 3 groups]

[PLEASE DISTRIBUTE THE SHEET/POSTER FOR SKETCHING]

As you see, we again use a diagram which includes a timeline for the period between the harvest season in 2013 until today as well as a moment eventually next year which indicates your expectations of a future situation. [point at the timeline]

01: First of all, we would like you to draw in all **important** key events you still remember due to a **drastic change or impact** on your and other residents' **livelihood, income, property and/or life stock in this Barangay**. Please try to state all key events in a maximum of two or three words.

[wait 10 minutes – after 5-10 minutes, assistants should inform them to finish]

In the next step, we would like you to plot the income per capita **in this Barangay** in light of the changes occurring over time, for instance due to the mentioned key events. Please be aware that this plotting does not necessarily reflect the change in your income situation but of the villagers in your Barangay in general.

02: On a scale **from "minus three" to "plus three":**

- where "**zero**" means "income of most of the Barangay residents at a moment during the harvest season in 2013 (September/October 2013)". So the initial situation starts in point 0.
- "**minus one**" means that the income situation of most of the people is worse compared to the initial situation. This includes that livelihood and property is worse off compared to the initial situation.
- "**minus two**" means the income source, livelihood and property of most of the Barangay residents is **partly** lost compared to the initial situation.
- "**minus three**" means the income source, livelihood and property of most of the Barangay residents is **completely** lost compared to the initial situation.

- "**plus one**" means that the income situation of most of the Barangay residents is better compared to the initial situation. This includes that livelihood and property is better off compared to the initial situation.
- "**plus two**" means the income source, livelihood and property of most of the Barangay residents **increased by more than 50%** compared to the initial situation
- "**plus three**" means the income source, livelihood and property of most of the Barangay residents **increased by more than 100%** compared to the initial situation.

Please use the **blue** permanent marker and sketch in **the development of income situation in this Barangay relative to the situation during the harvest season 2013**.

[please fix the description of the income scale to the numbers: -3, 0 and 3]

Kindly keep in mind that the corresponding points on the line should match with the dates. So please **differentiate between a gradual or immediate impact** of a key event.

[wait 10 minutes]

After we discussed the income situation, we would now like to assess the humanitarian aid this Barangay potentially received.

03: On a scale **from "minus three" to "plus three":**

- where "**zero**" means "humanitarian aid received by most of the Barangay residents at a moment during the harvest season in 2013 (September/October 2013)". The initial situation again starts in point 0.
- "**minus one**" means that the humanitarian aid received by most of the Barangay residents is lower compared to the initial situation.
- "**minus two**" means that the humanitarian aid received by most of the Barangay residents is much lower compared to the initial situation.
- "**Minus three**" means that the humanitarian aid received by most of the Barangay residents is **insufficient** in all needed areas compared to the initial situation.

- "**plus one**" means that the humanitarian aid received by most of the Barangay residents is higher compared to the initial situation.
- "**plus two**" means that the humanitarian aid received by most of the Barangay residents is much higher compared to the initial situation.
- "**plus three**" means that the humanitarian aid received by most of the Barangay residents is **excessive** compared to the initial situation.

Please use the **black** permanent marker and plot **the receipt of humanitarian aid by means of financial compensation or assistance in this Barangay relative to the situation during the harvest season 2013**. The humanitarian aid may be provided by the Local Government Unit, national government or any other agency or NGO in order to cope with the disaster loss caused by particular natural hazards.

[please fix the description of the humanitarian aid scale to the numbers: -3, 0 and 3]

[wait 10 minutes]

Finally, we would like you to think about solidarity in this Barangay. Think of solidarity as willingness to help others who came to a much worse position. As how cooperative do you perceive others in this Barangay. Did solidarity and cooperation change over time or remained relatively constant?

04: On a scale **from "minus three" to "plus three":**

- where "**zero**" means the prevalence of "solidarity in this Barangay at a moment during the harvest season in 2013 (September/October 2013)". This is the initial situation in point 0.
- "**minus one**" means that the solidarity level in the Barangay is lower than the initial situation.
- "**minus two**" means that the solidarity level in the Barangay is much lower than the initial situation.
- "**minus three**" means that most of the Barangay residents exhibit a **spiteful behavior**, where the solidarity level is considerably below the initial situation.

- "**plus one**" means that the solidarity level in the Barangay is higher than the initial situation.
- "**plus two**" means that the solidarity level in the Barangay is much higher than the initial situation.

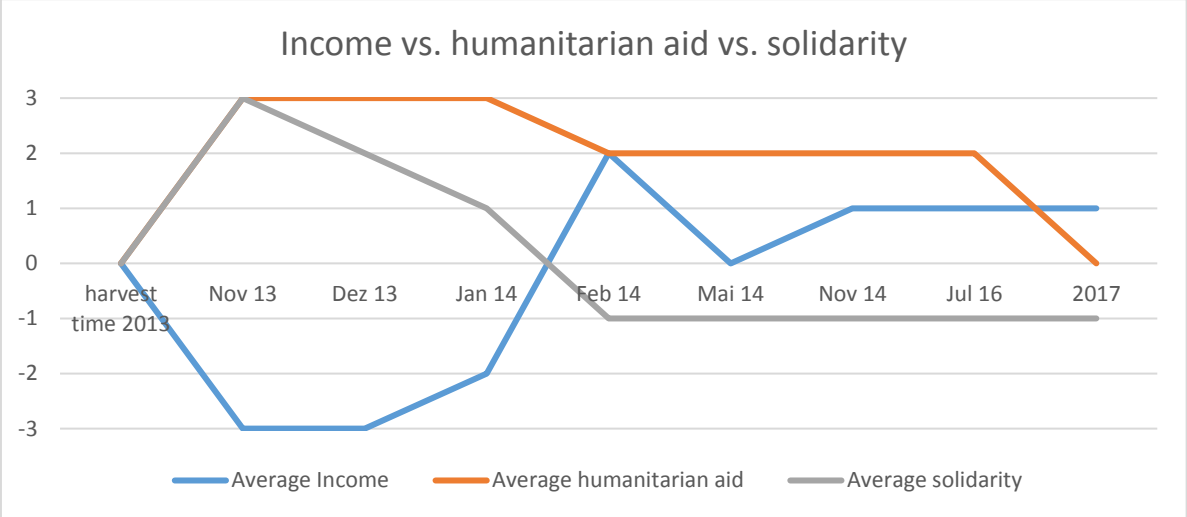
- "**plus three**" means that most of the Barangay residents exhibit an **extraordinary** level of helpfulness and cooperativeness, where the solidarity level is considerably above the initial situation".

Please use the **red** permanent marker and sketch in **the trend in solidarity in this Barangay relative to the situation during the harvest season 2013**. .

[please fix the description of the solidarity scale to the numbers: -3, 0 and 3]

[wait 10 minutes]

[Example:]



Thank you for the great work. All the diagrams represent your personal perception and thus, are correct. However, we would kindly like to ask you to discuss the results within the whole group and pick the diagram which best suits the development in this Barangay.

[wait 10 minutes]

[The assistants should kindly ask questions when turning points occur, e.g.

- Why did the line XY increase/decrease in a specific moment?
- What made the difference between the different levels?
- Why do you believe the forecasted development will be as shown?
- What changed for you in this period?
- How did you feel with the situation XY?
- What should have been done to prevent a negative development?
- Others: _____

Please feel free to ask any further questions that fit in the respective illustration.]

Beneficiary Selection and Exposure Ranking

In this part you are not in your group of 3, as we would like to you to discuss the following questions with all people in this room.

05 Imagine another typhoon of the size of Haiyan hits the island. The government or international donors are willing to give money. In your opinion, how should they distribute the financial aid or relief and who should or should not receive the support? And how much relative to others?

[Discussion for approx. 5 min]

[Write down comments of participants on a board]

[Move the tables aside if necessary to assure enough space for the following task]

06 We already raised some thoughts about conventional and unconventional humanitarian practices of targeting or beneficiary selection by international donors, NGOs and the government after natural disasters.

[Show all sheets of paper that list the following single beneficiary selection techniques on the floor and read them out loudly at the same time:]

On the present sheets, we noted down several proposals, such as:

- **According to people's exposure.** The higher the suffering or damage, the higher the relief.
- **Egalitarian.** This means all people from the Barangay receive the same amount of aid, regardless their losses.
- **Egalitarian towards exposed.** This means all people that lost something because of the typhoon receive the same amount of aid, regardless if some suffered more or less. People whose property was not at least partly destroyed by typhoon Haiyan/Yolanda receive nothing.
- **Priority on highly vulnerable victims**. These are disabled persons, female headed households and/or with majority elderly and children or households with single source of income which is based on a vulnerable industry, whose property was at least partly destroyed by typhoon Haiyan/Yolanda.
- **Priority on victims that prepared more for the typhoon than others.** (i.e. particularly, only those victims who conducted all preparatory measures and who have not (re-)built their homes in high-risk areas and in less resilient kind or only victims with disaster insurance for their uninsured losses and whose property was at least partly destroyed by typhoon Haiyan/Yolanda.)
- People whose property was at least partly destroyed by typhoon Haiyan/Yolanda, **but who do not receive remittances.**
- **First come, first serve approach,** i.e. people, whose property was at least partly destroyed by typhoon Haiyan/Yolanda should receive aid in the order of their claims.
- **Personal relations to agency staff, local elites or authorities.**
- **No-one receives aid.**

[In case there are other points mentioned in the discussion and **question 01**, add them in in the blank sheet “others” – for the rest, try to incorporate them in the given criteria]

[wait for additional remarks, add them to the blank sheet “others”, if applicable]

[now ask participants:]

Please rank the following practices and start with the one practice that should be primarily implemented. The practice you least want to be implemented should be placed below the other criteria. There can be only one criteria per row.

[Let them discuss, wait a moment, and take a picture of the final result]

[After completing the task, please provide them with the same set of sheets]

07 Now please tell us which practice was actually used according to your opinion. Please rank the same practices based on their actual implementation. Start with the one that was primarily implemented. The last sheet reflects the least applied practice. There can be only one criteria per row. Please put away those practices which were not used.

[Let them discuss, wait a moment, and take a picture of the final result]

BENEFICIARY SELECTION		
DESIRED PRACTICE (…shall be…)		**ACTUAL PRACTICE (…how it actually happened…)**
	According to people’s exposure. The higher the suffering or dam age, the higher the relief.	
	Egalitarian. This means all people from the Barangay receive the same amount of aid, regardless their losses.	
	Egalitarian towards exposed. This means all people that lost something because of the typhoon receive the same amount of aid, regardless if some suffered more or less. People whose property was not at least partly destroyed by typhoon Haiyan/Yolanda receive nothing.	
	Priority on highly vulnerable victims. These are disabled persons, female headed households and/or with majority elderly and children or households with single source of income which is based on a vulnerable industry, whose property was at least partly destroyed by typhoon Haiyan/Yolanda.	
	Priority on victims that prepared more for the typhoon than others. (i.e. particularly, only those victims who conducted all preparatory measures and who have not (re-)built their homes in high-risk areas and in less resilient kind or only victims with disaster insurance for	

	their uninsured losses and whose property was at least partly destroyed by typhoon Haiyan/Yolanda.)	
	People whose property was at least partly destroyed by typhoon Haiyan/Yolanda, **but do not receive remittances.**	
	First come, first serve approach, i.e. people, whose property was at least partly destroyed by typhoon Haiyan/Yolanda should receive aid in the order of their claims.	
	Personal relations to agency staff, local elites or authorities.	
	No-one receives aid.	
	Other (please specifiy): _____	

08 [ask participants:] Based on your experience after the typhoon Yolanda, please discuss what kind of people were the first who received humanitarian aid.

09 [ask participants:] Based on your experience after the typhoon Yolanda, were there any people that received more or less humanitarian aid than others or were excluded?

[PLEASE ASK WHY SOME RECEIVED LESS/MORE AND PARTICULARLY, WHY SOME WERE EXCLUDED FROM AID, IF APPLICABLE]

For the following last group discussion, we will mix up the groups and each group will have the possibility to work on another task. Now, the groups are mixed up in a way that each group consists of one fisher, one shop owner and one other person.

[wait until they changed their seats]

[The first group is preparing a Venn Diagram]

[The second group is preparing the SWOT Analysis]

[The third group is preparing the Conflict Matrix]

Group 1: Venn Diagram (FAO)

In the following, we would like you to create a map that shows all social relationships with and within people, groups and institutions. Think of the ones you value as important for your Barangay in connection with the assistance received after typhoon Haiyan hit the island.

In order to represent the different kinds of actors or institutions and their relationship, you can use different utensils, such as a large sheet of paper, colored paper in different sizes and shapes.

Firstly, here is a circle which represents your Barangay. Additionally, you receive other circles and triangles. The triangles can represent different individuals, such as neighbors or friends, while the circles represent, groups and institutions which helped you after Haiyan hit the island. Now, just write them down on the circles and/or the triangles which are available in three sizes. The biggest circle reflects the one most important to the people, meaning that they provided the greatest assistance. The medium circle reflects moderate assistance and the smallest circle reflects relatively little support.

To pursue the task, you can ask yourself some simple questions. There is no need to answer all of them. It is just supposed to help you with the task.

- Which organisations/institutions/groups are working in or with the community?
- Which institutions/groups do you regard as most important, and why?
- Who helped you during the storm?
- Who helped you directly after the storm?
- Who helped you during the reconstruction and recovery process?
- Whose help do you perceive as most efficient?

[wait 10 minutes until they finished the naming of all important actors]

For the placement of the circles and triangles, your need to consider the following: As far as individuals or groups and institutions are part of this community, they should be placed inside the big circle which shows your Barangay. The circles and triangles representing actors from outside the Barangay are placed outside this Barangay circle.

[point at the big circle]

- Which organisations/institutions/groups are found in the Barangay and which other ones from elsewhere are working with the Barangay?

[wait 10 minutes until they finished the placement of all important actors]

Furthermore, a little distance between the circles indicates the strength of the relation between the respective actors. Circles as well as triangles can also overlap. Whenever circles touch or overlap, interaction between the actors is shown.

- Which organisations worked together?
- What kind of assistance did exist among people?

largely distanced circles: no or little contact or co-operation

circles close to each other: only loose contacts exist

touching circles: some co-operation

overlapping circles: close co-operation

[wait 10 minutes until they finished the placement of all important actors]

Now, **arrows** [please draw →← on a paper] can be drawn to show in that interaction took place mutually/reciprocally between the actors. Also, you can use **flashes** [please draw 'flash' on a

paper] to demonstrate conflicts between the actors or **crosses** [please draw —X-- on a paper] where no interaction took place between the actors even though it should have.

- Are some particular social groups or kind of people excluded from being members of some groups or from beneficiary selection by certain organisations?
- Between whom did conflicts occur

Finally, were there any individuals, groups or organisations that did not assist you even though you wished them to do so? Here, you can use the triangles and circles coloured in blue to write them down and put them inside or outside the circle, which represents your Barangay.

- From whom would you have expected some support, which was missing?

Finally, please mark with an "X" who had a leading position in the decision making process of the provision of aid and help in general.

- Who makes the important decisions?

[Please ask the participants why decisions are made in a specific way. Let them explain why they consider one more important than the other and what kind of assistance was provided. Do not forget to ask for conflicts and missing help.

The assistants should kindly ask additional questions to ascertain all aspects of the social map, e.g.

- Why is the help provided by X-circle more important than by Y-triangle?
- Why is the help provided by X-triangle more important than by Y-circle?
- Why did you expect help from XY and why do you believe XY did not provide assistance?
- What kind of conflicts occurred?
- Where should corporation have taken place and what were the consequences of the lacking cooperation?
- What kind of ways of assisting each other do exist among people?
- In which way did you benefit from the different organisations?

FURTHER QUESTIONS POSSIBLE

Please feel free to ask questions whenever you feel that further explanation is necessary to understand the social relationships in and between the Barangay and others.]

Group 2: SWOT-Analyse

Now we would like to know more about how you dealt with the destruction caused by the storm Yolanda in 2013.

In case you were affected by Yolanda: Did you help each other or did you rely on external humanitarian aid- or both? Please reflect on your experience. What worked well, what did not, and why?

In case your Barangay was not directly affected by Yolanda: How did you perceive, people in affected areas cope with the disaster loss? Did they help each other or did they rely on external humanitarian aid- or both? Please reflect on your memories and impressions. What worked well, what did not, and why? In a second step, imagine your Barangay would have been affected by the typhoon Yolanda. What do you believe would have been the situation in your Barangay?

[Show Headings of the Table]

We have prepared a table for you. One for self-help and one for external humanitarian help.

Self-help can be defined as measures and mechanisms **inside the Barangay** to **help each other**. This help can relate to your family, your friends and neighbours as well as other Barangay residents or affected neighbouring Barangays.

External humanitarian aid can be defined as help coming from **outside the Barangay** in terms of emergency aid, relief distribution, recovery or reconstruction assistance. This help can be provided by all kinds of organisations, such as the Local Government Unit, government agencies, NGOs, international aid agencies, foreign donors and others.

[Point on S W O T in table]

In particular, we would like to ask you to identify strengths, weaknesses, opportunities and threats resulting from the way you dealt with the disaster.

In your opinion, what are strengths, weaknesses, opportunities and risks of each of the two forms of dealing after a typhoon? [wait some moments, let them comment]

For a better understanding – let me briefly explain what we understand by strengths, weaknesses, opportunities and risks.

- *Strengths:* Characteristics that worked well and/or had a positive impact on your Barangay in the past/present.
- *Weaknesses:* Characteristics that worked badly and negatively affected your Barangay in the past/present.
- *Opportunities:* Chances for improvement in the future and/or solutions to problems in the past.
- *Threats:* Risks that might hinder solutions to problem in the future or resolution of past issue.

In remembrance of the typhoon Yolanda in 2013, which experience or impressions do you remember?

You can discuss this topic in your group.

In the columns, please write down how you assess a) self-help and b) external humanitarian aid; try to allocate your ideas respectively.

Kindly note that we do not intend that you find points for all criteria given, meaning strengths, weaknesses, opportunities and risks for both, self-help and external humanitarian aid. We rather want you to **stick to the facts**:

[AFFECTED BARANGAY:] What experience did you personally make in your Barangay?

[NOT AFFECTED BARANGAY:] What impressions did you get from other affected areas?
[Let them use another colour :] In a second step, imagine your Barangay would have been affected by the typhoon Yolanda. What do you believe would have been the specific strengths, weaknesses, opportunities and threats in your Barangay?

[wait some moments: If comments are made, ask them to allocate them into the table.

Try to encourage them to tell their story.

Otherwise continue with further questions, such as:]

- Which issues occurred?
- Which positive experience did you make?
- Which negative experience did you make?
- Were there any challenges?
- What did not work at all?
- Why did it not work?
- Think also what impact either self-help or external help have on social interactions within your Barangay. Did your relationship to family, friends and neighbours change?
- What type of help can government/foreign aid provide what you cannot?
- Which impact did reconstruction assistance have?
- Others.

[please feel free to ask other questions as well]

{AFTER HAVING COLLECTED SEVERAL POINTS:]

[Let group discuss, note down people´s comments in the columns]

Self-help: Helping each other within the Barangay		**External humanitarian aid from outside the Barangay**	
Strengths - … - … - …	**Weaknesses** - … - … - …	**Strengths** - … - … - …	**Weaknesses** - … - … - …
Opportunities - … - … - …	**Threats** - … - … - …	**Opportunities** - … - … - …	**Threats** - … - … - …

Group 3: Conflict matrix (FAO)

In this tool we are looking at conflicts. Conflicts can arise due to various reasons.

[Show table] We prepared a table for you.

[Point at axes] On the vertical axis, we listed various topics that might cause conflict: be it financial relief aid - for example, people who got more aid than others or were excluded from aid. On the horizontal axis, we listed the groups that might cause conflict: within the household, within the barangay, with neighbouring villages, with strangers or with the government. We are not concerned with particular cases of conflicts, but rather with the intensity of occurring disputes and how often they happen **in this Barangay**.

Please rate on a scale from one to seven, how **intense** do you perceive the conflicts **within this Barangay with reference to the typhoon Yolanda**.

One means that you perceived the conflicts as "not intense" and seven means you perceived the conflicts as "very intense" **in your Barangay**.

The more intense the conflicts were, the higher the impact on the social relationship within the disputing group. The intensity does not necessarily need to correlate with the frequency conflicts occur. There could be a lot of small conflicts which correspond to a low intensity level rating. Whereas only one big conflict can correspond to a high intensity level rating.

[let them discuss for 3 minutes]

[let them fill in the rating in the column on the left hand side of the table "Intensity level of conflicts (Please rate from 1 to 7)"]

[Based on their answer, hand out the following amounts of beans:]

Let them choose one of the following rating (between 1 and 7)	1	2	3	4	5	6	7
Please distribute the corresponding amount of beans	10	20	30	40	50	60	70

You now receive the amount of beans matching your conflict intensity rating.

[show box with the respective amount of beans]

After selecting your perceived level of conflict intensity, you can now put beans in the columns based on the **frequency** that conflicts occurred **in this Barangay**. The more conflicts, the more beans you can put in the column. Kindly note we only look at how often the respective conflicts occurred.

[Point out the respective categories whilst speaking] Conflicts can exist within the household or within the barangay or with neighbouring villages, with strangers or with the government.

For example, if most of the conflicts were about topic "X" in any of the mentioned categories, put more beans inside this column compared to conflicts referred to as topic "Y" or another category. Few beans indicate that there are only few disputes, whereas many beans mean that there are many disputes.

In which areas or between which groups did most of the conflicts occur?

Consider all variations of conflicts when allocating the beans. You have only the number of beans available that were given to you. So try to arrange the beans in a way that best reflects the occurrence of conflicts.

Please ask additional questions:

- What kind of conflicts did occur?
- Which social groups were mostly involved in the conflicts?
- Please describe the long-term effect of these conflicts?
- Was there any chance to avoid this conflict?
- How many residents were mostly involved? Most of the Barangay residents vs. only a few residents?
- Which conflict did you perceive as the most intense?
- Which conflicts were completely new to you?
- Other?

Please feel free to ask any further questions that might be interesting!

[Once matrix is completed] How did you resolve the disputes? Did it require intervention by village officials? Was it treated at a higher level?

[Discussion among group members]

[Please take notes of any comments regarding the matrix and conflict resolution

Take a picture of the conflict matrix after completion of the task]

[THE FOLLOWING TABLE WILL BE PRINTED OUT ON A BIG SHEET AND GIVEN TO THE PARTICIPANTS OF GROUP 3.]

Intensity level of conflicts (Please rate from 1 to 7) _____	**CONFLICT MATRIX**				
	Within the household in this village	**Within the Barangay members in this village**	**With neighbouring villagers**	**With strangers in this village**	**With the state officials in this village**
Relief aid (e.g. food, water, etc.)					
Financial aid					
Reconstruction assistance and shelter					
Exclusion from aid					
Lack of Cooperation					
Other, specify:					
Other, specify:					

- Thank you -

A13 Key informant interview - BFARMC-leader interview

Interview with the BFARMC Leader

Barangay Name ……

Name and function of interviewed person ……

Number of fishers in this Barangay (registered and unregistered fishers altogether) ……

Number of boats in this Barangay (registered and unregistered) ……

I. Coastal Area of Barangay

a. General information about the coastal area of the barangay

1. Is there a **no-take zone (an area closed for fishing)**? □ Yes □ No
   If yes,
   How far is the no-take zone from this barangay?

   In km …… In travel hours by motor boat ……

2. The nearest **MPA in the municipal water** is
   □ In this barangay
   □ In the neighboring barangay
   □ In the neighboring barangay and also in ……. [number of] other barangay
   □ There is no neighboring MPA in the municipal water

b. Management

3. **How many** steering members does the BFARMC management council have?
   ……. men ……. women

4. **How often** does the BFARMC council organize meetings per year to discuss issues related to the management of municipal waters? ……..
   a. How many of them are held without the community ……..
   b. How many of them were open to the whole community …….

5. Does the BFARMC management council also mobilize fishermen for other activities? (e.g. political protests, community work, beach cleaning) □ Yes □ No

   If yes, what kind of activities?
□ Community work □ beach cleaning □ other □ other

6. **Besides the BFARMC Committe**e, which other organizations for management of marine resources exist in this barangay?

Last column **Decision making scale**: If applicable, according to your opinion- on a scale from 1-4, how do these stakeholders **participate in the decision making** of how this coastal area is managed?
1= no participation at all 2= only attendance of meetings
3= attendance of meetings and voting power
4= highest decision body: attendance of meetings, voting power and is consulted in every decision

Type			**No. organizations/ committees, groups etc.**		If yes, how do you as the BFARMC Committee **cooperate** with each of the organizations/ committees, groups	**Decision making scale**
	Yes	No	**If applicable, Before** MPA was set up	**Today**		
Fishermen Organization						
Committee (MPA) related						
Business Group						
Other □ Research/ Academics □ NGO						

7. To sum up the management section, please provide details….

… **what works well** within the BFARMC?	… **what works badly** within the BFARMC?
… what is needed for a better working BFARMC?	

c. Rules

8. Which of the following rules and regulations about fishing exist in the coastal area of your barangay?
   Are there other regulations in your community regarding fishing? If yes, please fill in ***others***.

   [in 4th, 5th & 6th column: L= Local Ordinance, B= Barangay Ordinance, F= Fishermen]

Formal Regulations			Who was responsible for creating this rule?			Did the number of rule breakings 1= Decrease 2= Remained the same 3= Increase	
	Yes	No	L	B	F	Immediately after typhoon Yolanda	Today compared to the time before typhoon Yolanda
a) No Take Zone: Areas where you are not allowed to fish at all	□	□	□	□	□		
b) Not to use dynamite and cyanide for fishing	□	□	□	□	□		
c) Seasonal restrictions to fish	□	□	□	□	□		
d) Certain species you are not allowed to fish	□	□	□	□	□		
e) Prohibited to use specific mesh size	□ Please specify Size	□	□	□	□		
Other ……..…….							

9. What are **reasons** for rule breakings?

……

……

Do fishers get convicted after rule breakings? □ Yes □ No

If yes, please specify how often in a year: ……..

10. If a rule from question 1 was given to the village by an outside authority (e.g. local government), did …

Remember, the formal rules are:
a: No Take Zone
b: Not to use dynamite and cyanide for fishing
c: Seasonal restrictions to fish
d: Certain species you are not allowed to fish
e: Prohibited to use specific mesh size)

…. the BFARMC Committee get

	Yes	No	If yes, please specify rule (a, b, c, d, e)
Freedom to adapt the rule to your needs	□	□	
Training how to implement the rule			
Continuous technical support from the authority for the how to implement the rule	□	□	
Help in monitoring and enforcement	□	□	
Explanation why the rule is important	□	□	

…. fishers get

	Yes	No	If yes, please specify rule (a, b, c, d, e)
Freedom to adapt the rule to your needs	□	□	
Training how to implement the rule			
Continuous technical support from the authority for the how to implement the rule	□	□	
Help in monitoring and enforcement	□	□	
Explanation why the rule is important	□	□	

11. Are there also **informal/ traditional rules** in the coastal area of your barangay? Informal rules are rules not written in an official document, rules fishers communicate with themselves. □ Yes □ No

If yes, please name informal rules.

……

……

……

……

……

d. Success Factors

12. Please **rank** these items from **1-13 (1=most important, 13=least important)** how the BFARMC Committee should prioritize their goals for a **successful managed coastal area**.

	Rank
Cooperation and coordination of fishing management (High attendance at meetings of BFARMC)	
Rules are enforced	
Catch is increased, also for sales	
Fishers have alternative source of income	
Whole community cooperation and coordination to reach inclusiveness	
Women and Children are empowered	
Disaster prevention and relief: The community has a better sense of greater security when there is a natural disaster	
Protection of the Environment	
Monitoring and Evaluation works well (Feedback)	
Good Data Collection and Recording	
Boundaries are clearly defined	
Fishers get continuous training on fishing techniques	
Enough fundraising from higher level of government, ministry or NGOs for projects, equipment etc.	

Are there any other points than listed in 1 that you would use to measure a successful managed coastal area? □ Yes □ No

If yes, please specify and explain why? Which rank would you give these new points?

……

……

13. Now comes a list of issues that may or may not affect fisheries in the coastal area of your barangay. For each, could you tell me if it is a problem, and if it is, how important is it?

Problem	Not a problem	Almost not a problem	Problem	Important problem	Very important problem
Lack of clarity of rules	□	□	□	□	□
Lack of monitoring	□	□	□	□	□
Too many fishermen	□	□	□	□	□
Some fishermen do not respect rules	□	□	□	□	□
Lack of economic/income alternatives	□	□	□	□	□
Lack of technical support	□	□	□	□	□
Disputes among fishermen	□	□	□	□	□
Stealing or vandalism e.g. destruction of fishing gear	□	□	□	□	□
The impact of natural hazards	□	□	□	□	□

Fishers have no voting power in the decision making of how the municipal water is managed	□	□	□	□	□
Outside influence (e.g. politicians, NGO)	□	□	□	□	□
Unclear responsibilities for management of fishery resources	□	□	□	□	□
Fishermen have too little time to attend meetings	□	□	□	□	□

14. Out of the number of fishers in your barangay, how many…

	If there is an MPA in municipal waters: Before the establishment of the MPA within municipal waters	Today
… fishers in your barangay, had/have an **alternative source of income**		

15. What are **alternative sources of income for fishermen**?

□ Construction □ Drivers □ Farmers □ Government Employees

□ Other …… □ Other …… □ Other ……

16. How do **you as the BFARMC** leader perceive the **future of fish catches?**

□ very negative □ negative □ no change □ positive □ very positive

Please explain, why?

……

……

17. How do **fishers** in the coastal area of your barangay perceive the **future of fish catches?**

□ very negative □ negative □ no change □ positive □ very positive

Please explain, why?

……

……

18. Over the last 4 years, how did the level of competition developed between….

	Got less	Remained the same	Increased
(a) … fishers ***in your barangay***			
(b) …. fishers in your barangay **and the ones from the neighboring barangay**			
(c)….fishers in this barangay **and unregistered** fishers			

Do you think the MPA has an influence on the level of competition?

□ Yes □ No

If yes, please explain and state between which actors (a, b, c).

……

……

……

19. What are consequences of more competition?

……

……

20. Do fishermen perceive competition rather as a good or a bad thing? Please explain.

……

……

21. **If there is a coral reef**, did the area decrease, remained the same, increase over the last 4 years?
□ decrease □ remained the same □ increase

Are the corals protected by an MPA? □ Yes □ No

22. **If there are mangroves**, did the area decrease, remained the same, increase over the last 4 years?
□ decrease □ remained the same □ increase

Are the mangroves protected by an MPA? □ Yes □ No

23. If there is an MPA within municipal waters: Please state if the following numbers decreased, remained the same or increased ever since the establishment of the MPA. **In case of an increase or decrease, please specify after how many years.**

*If there is **no MPA** within municipal waters**:** Please state if the following numbers decreased, remained the same or increased in the **past 4 years**?*

	1= decrease 2= remained the same 3= increase
Households in your barangay, that depend on fishing as their main income source	
Number of different fish species	
Number of other species	
Number of average fish yield	
Number of illegal fishing	

If there was no increase in fish yields, what are reasons behind that?

……

……

If there was no increase in fish species what are reasons behind that?

……

……

24.

If there is an MPA within municipal waters		
On a scale from 1 to 5 (1 = strongly not accepted, 2= not accepted, 3=neutral, 4= accepted, 5= strongly accepted), how much is the MPA socially accepted within your barangay?		
Are there groups that oppose the MPA?	□ Yes Please specify groups that oppose the MPA. What are their reasons for opposing the MPA?	□ No

If there is <u>no</u> MPA within municipal waters:	
*On a scale from 1 to 5 (1 = strongly not accepted, 2= not accepted, 3=neutral, 4= accepted, 5= strongly accepted), how much **would an establishment of an MPA** be socially accepted within your barangay?*	
*What are **groups that would oppose** the establishment of an MPA?*	

25. On a scale from 1-5 (1 =very bad impact, 2=bad impact 3= no impact, 4= good impact, 5 = very good impact) please rate

If there is an MPA within municipal waters: to what extent the MPA has an impact on the coastal area in your barangay in terms of…

If there is no MPA within municipal waters: *to what extent you think an MPA* ***would have*** *an impact on the coastal area in your barangay in terms of…*

	Scale from 1-5
More cooperation and coordination of fishing management (Higher attendance at meetings of BFARMC)	
Rules are enforced	
Catch/ Fish yields is increased, also for sales	
Fishers have more alternative source of income	
Better community cooperation and coordination to reach inclusiveness	
Women and Children are empowered	
Disaster relief: The community has a better sense of greater security when there is a natural disaster	
Better Protection of the Environment	
Monitoring and Evaluation works better (Feedback)	
Better Data Collection and Recording	
Boundaries are clearly defined	
Fishers get more continuous training on fishing techniques	
More fundraising from higher level of government, ministry or NGOs for projects, equipment etc.	

26. Would you as the BFARMC leader want to establish an/another MPA in the coastal area of your barangay? □ Yes □ No

Please give reasons for your decision.

……

……

……

27. Would fishers in your community be willing to set up an/another MPA?
□ Yes □ No

Please give reasons for your decision.

……

……

……

28. What extra support does an area with an MPA get compared to a Non-MPA Area?

……

……

……

……

……

III. Fishery- Natural Disaster

29. Compared to the neighbouring **fishing community**, were fishers in your barangay **more/same/ less affected by typhoon Yolanda**?

□ More □ Same □ Less

30. **Which form of help after a typhoon as Yolanda** do you consider as relatively more important for fishers in your barangay

□ Self-help strategies □ External financial humanitarian assistance?
□ External technical humanitarian assistance

Please explain why?

……...

……..

31. Did your BFARMC Committee get any **warning** that typhoon Yolanda will occur?
□ Yes □ No

32. Did your BFARMC Committee use any **preparatory measures** before typhoon Yolanda hit the island? □ Yes □ No

If yes, please explain the preparatory measures.

……...

……..

33. Did your BFARMC Committee receive **external financial aid from the government/foreign donors** after typhoon Yolanda? □ Yes □ No

    If yes, on a scale from 1 to 7 (1=very little, 7= a lot), how much did you get external financial aid from

the government …… NGOs/ foreign donors ……

34. Did your BFARMC Committee receive **external technical aid from the government/foreign donors** after typhoon Yolanda? □ Yes □ No

    If yes, which form of **technical** aid did you receive?
    ……

    If yes, on a scale from 1 to 7 (1=very little, 7= a lot), how much did you get external technical aid

    the government …… from NGOs/ foreign donors ……

35. Comments on Yolanda exposure and how fishers dealt with it

……...

……..

……...

……..

A14 Key informant interview - MPA-leader interview

Interview with the MPA Leader

Barangay Name ……

Name of MPA ……

Name and function of interviewed person ……

I. General Information on this MPA

1. **When** was this MPA established? ……

2. The **decision** to start this MPA came from the [multiple entries possible]

Government Level	□	NGO	□
Municipal Level	□	Academic/ Research Institution	□
Barangay captain	□	Other ……	□

3. **Why** was this MPA started?

Local Government Decision	□	For Economic reasons	□
National Government Decision	□	For Food Security	□
Other ……	□	Other ……	□

4. Please cross, what is the governance system of this MPA?

Traditional Based on traditional ecological knowledge. Governance system has been existing for a long time	□
Bottom- up Primarily led by fishers, generally small-scale	□
Co- management Joint management by fishers **and** government	□
Centralized Led by government agency, consultative with fishers	□
Private Private sector (big fishing companies) led	□
Other	□

5. Is there any management council?
   □ Yes □ No

6. Is there any management plan?
   □ Yes □ No

   Coming up with the management plan of the MPA:
   Was it participatory- such in that fishers in the community worked out together a management plan with authorities?
   □ Yes □ No

7. Does the committee of this MPA get **external financial or external technical suppor**t?
   □ Yes □ No □ I don´t know

If yes, please specify who provides f**inancial and/or technical** support and state specify the kind of support.

	F**inancial support**		**Technical** support	
		kind		kind
Central Government	□		□	
Local Government	□		□	
NGO	□		□	
Other ……..	□		□	

8. Does the MPA Council have financial extra revenues?

   If yes, are the **MPA financial revenues used for community development projects**?
   □ Yes □ No

   If yes, please specify the kinds of community development projects.

……

……

……

9. Does the MPA council have exra technical equipement that all fishers can use?

   □ Yes □ No

10. Please provide details,

… **what works well** within the MPA?	… **what works badly** within the MPA?
… what is needed for a better working MPA?	

II. Management

11. **How many** steering members does the MPA management council have?
……. men ……. women

12. **How often** does the MPA council organize meetings to discuss issues related to the management of municipal waters? ……..
    a. How many of them are held without the community ……..
    b. How many of them were open to the whole community ……..

13.

	Out of 10 **decisions**, how many are made by ….	Kind of decisions made….	How are the decisions made? 1= Secret majority vote 2= open majority vote 3=consensus
…. By MPA steering committee alone			
….with community/ fishermen			

14. Does your MPA council **cooperate** with the council from the neighbouring MPA?

□ Yes □ No

If yes, please explain how you cooperate with the other MPA councils?

……

……

……

15. Comments

……

……

……

A15 Key informant interview - barangay captain interview

- Key Informant Interview –

Approx. 2 h

Date:_____ Village:_____

Name: _____

I. INTRODUCTION:

Good morning / afternoon / evening.

My name is Shiow Mie, I work for ……., a private local research company that conducts all types of research. Today we are conducting research for Professor Björn Vollan's research group from the Philipps-University of Marburg in Germany.

[If asked to explain reason for interview, say:] Our company has been appointed by the research group of the Philipps-University of Marburg in Germany. The research team already conducted several research projects in the Philippines. In 2012, one of these projects was also conducted in cooperation with the Microinsurance Innovations Program for Social Security in this Barangay.

The purpose of one of the activities is conducting periodical surveys. The other is to gain better understanding of the main problems that the Barangays in the Philippines are facing due to an increasing harassment by natural disasters. Currently, we are asking your opinion about the experience your Barangay made after the typhoon Haiyan hit the island in 2013. Therefore, we would like to conduct a **brief** survey and ask you some further questions in a following interview.

The information you will give us is strictly confidential and no one will bother you in any way about what you say concerning the questions we ask you. All responses would be compiled in the form of numbers that will be published in such a way that it is impossible to trace these answers to a certain individual. So your name will not be shown in the final result. Thus, we ask you to give honest response.

Do you mind me recording this session? The record will be used for personal purpose only and will be destroyed after the evaluation is completed. I can assure that all data will be handled strictly confidential.

FIRST OF ALL, WE WOULD LIKE TO ASK SOME BACKGROUND QUESTIONS. Therefore, we would like to ask you to fill in a questionnaire first.

I. PRE-QUESTIONNAIRE (10 min)

01 As far as you remember, how often did the following disasters affect your village in the last 5 years?

a. Floods _____times
b. Typhoons _____times
c. Earthquakes _____times
d. volcanic eruptions _____times
e. droughts _____times
f. fire _____times
g. other, please specify _____ _____times

02 From your perspective, how strongly was your barangay damaged by the typhoon Haiyan (Yolanda)Please choose the degree of destruction on a scale from one to seven, where one means "**not affected at all**" and seven means "**incredible damage**".

Disaster Loss	**1** **Not affected at all/ no damage**	**2** **Negligible damages** (e.g. to houses and some crops, etc.)	**3** **Minor damages** (e.g. to houses, significant damage to signs/trees, heavy damage to some crops, etc.)	**4** **Moderate damage** (e.g. to some houses and structural damage, power failures, etc.)	**5** **Severe damage** (e.g. most of the houses and infrastructu re partly destroyed, widespread power failure, etc)	**6** **Devastating damage** (e.g. significant house damage and structural damage in most of the area, injured, etc.)	**7** **Incredible damage** (i.e. extremely dangerous with extreme, widespread destruction of houses, infrastructure, fatal casualties, etc.)
Your barangay	☐	☐	☐	☐	☐	☐	☐

Would you like to emphasize specific aspects of the damage caused by the Typhoon?

_____

_____

_____

_____

_____

_____

03 If you compare the destruction in your barangay to that in other barangays, do you believe it was more or less damaged?

□ More
□ Same
□ Less
□ I do not know

04 We would like to get a better perspective on the damage caused by the typhoon. Could you please help us assess the various types of damages that may have occurred and how much time and money it took them to be repaired/recovered? Please answer the following questions to the best of your knowledge. [leave blank if the mentioned item was no there before the typhoon]

	damaged/ harmed		[if yes:] How many days did it take to repair/recover Or: still ongoing?	[if yes:] How much money (PHP) did it cost you to repair/recover? [request documents if possible]	[if yes:] Is this item from the list in **the same** or a **better** condition than before the storm	
roads in / and near the village	□ Yes	□ No			□ Yes	□ No
access to fresh water	□ Yes	□ No			□ Yes	□ No
access to food	□ Yes	□ No			□ Yes	□ No
access to pharmaceuticals	□ Yes	□ No			□ Yes	□ No
access to medical care	□ Yes	□ No			□ Yes	□ No
access to schools	□ Yes	□ No			□ Yes	□ No
access to cash/financial services	□ Yes	□ No			□ Yes	□ No
agriculture/fishery	□ Yes	□ No			□ Yes	□ No
electric infrastructure	□ Yes	□ No			□ Yes	□ No
access to internet	□ Yes	□ No			□ Yes	□ No
cellphone towers	□ Yes	□ No			□ Yes	□ No
telephone lines	□ Yes	□ No			□ Yes	□ No
other: _____	□ Yes	□ No			□ Yes	□ No
other: _____	□ Yes	□ No			□ Yes	□ No
other: _____	□ Yes	□ No			□ Yes	□ No

05 The Barangay Development Council is responsible of the Mitigation, Preparedness, Response and Recovery if the Barangay is affected by a natural disaster. Do you receive an additional financial compensation for your efforts referring to your position as the Chairperson of the Council?

□ Yes [If yes:] a lump-sum? □ Yes □ No
□ No

[If yes:] How much did you receive for your efforts referring to the typhoon Haiyan/Yolanda?

PHP _____

06 [If **Q 05 no**:] Would you say that no payment of a compensation was adequate? □ Yes □ No

[If **Q 05 yes**:] Would you say, all things considered, that the compensation you received for your efforts as a chairperson in this Barangay was adequate? Please rate on a scale from 1 to 7, where one means "not adequately compensated" and seven means "very adequately compensated".

Compensation for efforts	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	□	□	□	□	□	□	□

II. SEMI STRUCTURED INTERVIEW

[a. DISASTER LOSS (10 min)]

01 We would like to get a better idea about how the situation looked like after the typhoon struck your barangay. In your own words, could you please describe to us what you believe to be the worst effects? Was there a certain pattern of destruction, e.g. houses next to the beach usually most affected?

- □ Barangay not highly affected **at all: Please consider even small scale destructions:**
- □ Barangay affected:

_____

_____

_____

_____

_____

_____

02 Please tell us a little bit more about what you believe to be the long-term impact of the typhoon on social relationships, households, buildings, community, etc.

- □ Barangay not affected **at all: Please consider the potential effect that it might been caused**
- □ Barangay affected:

_____

_____

_____

_____

_____

_____

[b. DISASTER LOSS MITIGATION AND RESPONSE (10 min)]

01 Do you have any official documents (e.g. a Barangay Development Plan/**Disaster Risk Reduction and Management Plan**), according to which you performed all preparations before and the assistance after the typhoon Haiyan hit the island? [Please ask for documents]

- □ Yes
- □ No
- □ Any other official guidelines, specify _____

[If no, move to the **Q 02**]

01.a [If yes:] Were you able to put all instructions into actions referring to the typhoon Haiyan?

- □ Yes
- □ Partly
- □ No

02 In detail, were any official preparatory measures taken before the typhoon in your area?

- □ Yes
- □ No

[If no, move to the **Q 03**]

[If yes:] **02.a** Which one were taken?

_____

_____

_____

[If yes:] **02.b** Who was mainly responsible of the procedure?

[tick off possible alternatives if applicable; otherwise comment below:

- □ national government,
- □ LGU,
- □ barangay council,
- □ NGO,
- □ civil society organizations
- □ on individual level only]

_____

_____

03 Did an evacuation take place before the typhoon hit the island?

- □ Yes
- □ No

[If no, move to the **Q 04**]

[If yes:] **03.a** What type of organization carried out the evacuation?

□ National government
□ Local Government
□ Barangay council
□ Government agency, specify: _____
□ NGO/multilateral agencies: _____
□ Other, please specify: _____

[If yes:] **03.b** Were all members of your community evacuated?

□ Yes
□ No [If no:] How many? _____ out of _____ .

[If no:] **03.b.i** Why not? [continue with question 03.b.ii f only specific groups were evacuated]

[If no:] **03.b.ii** Based on which **selection criteria** were the groups chosen? **Who** formulated the criteria and **on which ground**? [if applicable, request **documents]**

_____

_____

_____

_____

04 Did you provide any relief assistance?

□ Yes
□ No

[If no, move to the **next part: c. Financing the disaster loss**]

[If yes:] What was the focus of the relief response, e.g. food aid, shelter, health, nutrition or reconstruction in your Barangay **and** what are the **particular risks** associated with each area?

[Please tick off, if applicable and make notes on risks]

□ shelter |risks: _____
□ food aid |risks: _____
□ health |risks: _____
□ nutrition |risks: _____
□ reconstruction |risks: _____
□ other: _____
|risks: _____
□ other: _____
|risks: _____

[in case he or she does not mention any risks, please ask once again more specifically for the risks, if any type of assistance was given]

[c. FINANCING THE DISASTER LOSS (10 min)]

01 [**documents to be requested:**] How much humanitarian aid in cash or in kind was pledged and how much was finally received? referring to typhoon Haiyan/Yolanda referring to typhoon Haiyan/Yolanda, i.e. for recovery and reconstruction. [use n/a, if not applicable]

	Aid pledged (in PHP)	**Aid received (in PHP)**	**[Additional comments]**
[Who received?]			
by the Barangay in total?			
by the Municipality in total?			
[Who provided?]			
from the government			
from foreign government			
from national | foreign NGO			
from private donors			
from barangay community			
from other, please specify _____			

[Continue with the next part: d. **COOPERATION/COORDINATION BETWEEN AGENCIES AND NGOs**, if Barangay was **not** affected **at all** [Q02 pre-Q] by the typhoon **and no assistance** obtained]

02 [only if assistance:] Were you able to decide on the allocation of the budget for the purpose of

a. evacuation?	b. aid distribution?	c. reconstruction	d. Other: _____
□ Yes	□ Yes	□ Yes	□ Yes
□ No	□ No	□ No	□ No
□ Partly	□ Partly	□ Partly	□ Partly
□ n/a	□ n/a	□ n/a	□ n/a

[If **no** or **partly**:] **02.a** If no, is the budget allocation determined by another agent?

a. evacuation:	b. aid distribution:	c. reconstruction:	d. Other: _____
□ NGO/donor	□ NGO/donor	□ NGO/donor	□ NGO/donor
□ Municipal Govt.	□ Municipal Govt.	□ Municipal Govt.	□ Municipal Govt.
□ Provincial Govt.	□ Provincial Govt.	□ Provincial Govt.	□ Provincial Govt.
□ Regional Govt.	□ Regional Govt.	□ Regional Govt.	□ Regional Govt.
□ National Govt.	□ National Govt.	□ National Govt.	□ National Govt.
□ _____	□ _____	□ _____	□ _____

03 Were funds reallocated from ongoing programmes to finance recovery and reconstruction assistance?

□ Yes, please specify which: _____
and why: _____

_____

□ No

04 Were funds reallocated from funds for recovery and reconstruction aid to finance other important programmes?

- □ Yes, please specify which: _____
  and why: _____

  _____
- □ No

[d. COOPERATION/COORDINATION BETWEEN AGENCIES AND NGOs (20 min)]

01 What are the main humanitarian actors in the crisis, in particular after Haiyan hit the island? Nationwide [if this Barangay was not affected] and more specifically, in this Barangay [if applicable]?

[Nationwide] _____

_____

[This Barangay, if applicable] _____

_____

02 Was the response dominated by international or national actors?

Nationwide:

- □ International actors
- □ National actors

[if applicable:] More specifically, in this Barangay:

- □ International actors
- □ National actors

03 How many NGOs and government agencies operated in your barangay/closest area in the aftermath of the typhoon?

- International NGOs/multilateral organizations _____
- National/local NGOs _____
- Government agencies _____
- Civil Society Organisations _____

  [If CSOs are operating:] **03.4** Which functions do CSOs fulfil in this Barangay? In particular, how did they respond to natural disasters, especially, after Yolanda hit the island?

_____

_____

[If the Barangay was **not affected at all [Q 02 pre-Q]** and **no** NGO or government aid agency was present in the Barangay and provided assistance, please move to **Q 09**]

04 What kind of assistance did these organisations/agencies provide in this Barangay?

_____

_____

05 [If there were **more than two** government agencies or non-governmental and multilateral organisations:] Do you feel they worked with each other or did it each of them focus on their own agenda without cooperating with each other at all? Did they work efficiently?

_____

_____

_____

_____

06 [if any humanitarian organisations, NGOs, government agencies present in the Barangay:] Did you appreciate working with local or international NGOs or government agencies? Please indicate your perception of working with different aid stakeholders on a scale from one to seven, where one means that your first-hand experience was "very bad" and seven means "very good".

Collaboration with	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**n/a**
National/local NGOs	☐	☐	☐	☐	☐	☐	☐	☐
Multilateral organizations	☐	☐	☐	☐	☐	☐	☐	☐
Government agencies	☐	☐	☐	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐	☐	☐	☐

[n/a = not applicable, if the respective institutions were not present in the Barangay]

07 [if any humanitarian organisations, NGOs, government agencies present in the Barangay:] Did these agencies or NGOs consulted with you and/or the community at any stage during the beneficiary selection and relief distribution process?

- ☐ Yes
- ☐ No

[If yes:] **07.a** Please state which efforts has been made:

[or If no:] **07.a** Please explain why:

_____

_____

_____

_____

08 Local leadership can be defined as the need to respect and support local capacity to deal with the disaster, ranging from an increased involvement of local actors, such as the affected population, to their capacity building in order to enhance and organize their systems, resources and knowledge and to perform functions, solve problems and achieve objectives, collectively.

With reference to this Barangay, please indicate your perception of local leadership in humanitarian aid on a scale from one to seven, where one means "no involvement" and seven means "local empowerment".

Local leadership	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Involvement of Barangay council	☐	☐	☐	☐	☐	☐	☐
Involvement of local community	☐	☐	☐	☐	☐	☐	☐

08.a Please briefly explain why you chose these ratings.

_____

_____

[Continue here (**Q 09) if no NGOs or aid agencies present in this Barangay**]

09 Do you think that help was perceived differently by the local community if the assistance was conducted by "outsiders" or "strangers"? This can be related to the evacuation process, the relief or reconstruction aid.

_____

_____

_____

_____

10 Please compare the governmental aid and the foreign aid provision: Which do you consider as

…most effective and why? _____

_____

_____

…fairer and why? _____

_____

_____

…most transparent and why? _____

_____

_____

…most community-based/sustainable and why? _____

_____

[e. BENEFICIARY SELECTION AND DISTRIBUTION (15 min)]

[Please choose between Q 01.a or Q 01.b based on the situation in this Barangay:
- not affected/assistance not provided or
- affected/assistance provided.]

01.a **[If not applicable,** i.e. if Barangay was not affected and**/or** relief was not provided:]

Based on which beneficiary selection criteria **should** aid **(relief, recovery, reconstruction assistance)** be distributed and why? Who would be responsible of formulating the criteria and on which ground?

01.b [**if applicable**, i.e. if relief was provided in the Barangay:] // o

Based on which beneficiary selection criteria did you distribute aid, i.e. **relief, recovery, reconstruction assistance)**? Who formulated the criteria and on which ground?

[**documents to be requested, if applicable**]

[Add the received information above or tick off the mentioned items, if applicable. Do not read the following suggestions:00

- □ formulated by LGU
- □ formulated by Barangay Council
- □ formulated by Government aid agency
- □ formulated by Barangay community
- □ formulated by NGOs]
- □ beneficiary criteria: houses destroyed
- □ beneficiary criteria: vulnerable groups
- □ beneficiary criteria: percentage of loss
- □ beneficiary criteria: equal share to those affected
- □ beneficiary criteria: whoever registered]

_____

_____

_____

_____

_____

_____

[**If not applicable**, i.e. if Barangay was **not affected** at all [Q 02 pre-Q] and **no** assistance was provided, move to the **Q 07**.]

[questions 02-06 don't need to be asked if no relief assistance provided **and** Barangay not affected:]

02 Do you think it was a good decision to distinguish among the people for beneficiary selection?

_____

_____

_____

03 How did you proceed to identify those people who were entitled for assistance in terms of relief goods or reconstruction based on the beneficiary selection criteria?

- □ Based on self-registration by the affected people
- □ Based on needs assessment by Barangay officials/LGU officials [door to door questioning]
- □ Based on needs assessment by NGO

[request all documents available and take pictures or make copies of them, such as

- **household-lists**
- **lists which were compiled after the typhoon Haiyan hit the island (e.g. in order to record all completely/partly destroyed houses)**
- **lists used for beneficiary selection after financial assistance was approved]**

04 Did you face any particular challenges or interference in the targeting and registration process?

_____

_____

_____

05 How many people in your barangay received aid? Please specify

05.a For relief assistance/goods: _____ out of _____

05.b For financial assistance: _____ out of _____

05.c For reconstruction: _____ out of _____

06 If there were some people who were deliberately excluded from the relief distribution process: Do you feel that they were disadvantaged?

_____

_____

_____

_____

The following three questions should be answered based on the experience in this Barangay if the Barangay was affected and relief assistance was provided; otherwise based on your perception:

Please indicate whether the following questions will be answered:

- □ based on your experience in this Barangay.
- □ based on your general perception, if this Barangay was **not affected** by the typhoon.

07 Selective targeting in humanitarian assistance has the purpose to meet the needs of the most vulnerable. The targeting criteria is usually linked to the level or degree of vulnerability of a community, household or individual, e.g. female-headed households or households with many children, majority elderly people or disabled persons. Hence, assistance is provided based on the **vulnerability and needs** of individuals or groups affected by disaster.

Did you perceive the selective targeting of relief distribution as generally fair, transparent or discomforting? Please indicate your perception of distribution selection on a scale from one to seven, where one means "I do not agree at all" and seven means "I completely agree".

Selective targeting	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**I do not know**
Fair	☐	☐	☐	☐	☐	☐	☐	☐
Transparent	☐	☐	☐	☐	☐	☐	☐	☐
discomforting/uneasy	☐	☐	☐	☐	☐	☐	☐	☐

08 When you think of beneficiary selection in terms of fairness: Do you think that selective targeting leads to a potentially negative or positive social impact on the community? Please rate on a scale from one to seven, where one means "very negative impact", four means "no impact" and seven means "very positive impact".

1 (Very negative impact)	**2** (negative impact)	**3** (rather negative impact)	**4** (No impact)	**5** (rather positive impact)	**6** (positive impact)	**7** (Very positive impact)
☐	☐	☐	☐	☐	☐	☐

08.a Please explain your decision in more detail:

_____

_____

_____

_____

09 Did you perceive the distribution of humanitarian aid as transparent or hidden? Please indicate whether the beneficiary selection and the distribution of aid was visible/traceable for others (e.g. neighbours, friends) on a scale from one to seven, where one means "completely hidden" and seven means "completely transparent".

hidden vs. transparent	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Beneficiary selection	☐	☐	☐	☐	☐	☐	☐
Distribution of aid	☐	☐	☐	☐	☐	☐	☐

[Please move to the next part **g. Longterm Impact** if Barangay was **not affected** [Q 02 pre-Q] and **no assistance** provided, continue with part **f. Responsiveness** otherwise:]

[f. RESPONSIVENESS (5 min)]

01 Were complaints and feedback actively requested from the villagers in your barangay?

- □ Yes [If yes, tick off those applicable:] by
  - □ Barangay Council/LGU
  - □ Government agency [e.g. COA, CHR, etc.]
  - □ National/local NGO
  - □ International NGO/aid agencies
- □ No
- □ Other approaches, specify _____

_____

[If yes or other approaches:] **01.a** How high was the response rate and what incidents were mostly reported? Which implications did those feedbacks have on your on-going work?

[**protocols to be requested and copies or pictures to be made:**]

[Response rate: tickle off those applicable:]

- □ Total amount of complaints: _____
- □ very high
- □ high
- □ rather high
- □ rather low
- □ low
- □ very low

[incidents mostly reported:] _____

_____

_____

[implications on on-going work:] _____

_____

_____

[g. LONGTERM IMPACT (15 min)]

01 On a scale from one to seven, where one means "I do not agree at all" and seven means "I completely agree", how appropriate do you rate the following potentially changes **in your Barangay** after the typhoon: [please rather choose **n/a if not applicable** to this Barangay]

"Build back better"	**1** I do not agree at all	**2**	**3**	**4**	**5**	**6**	**7** I completely agree	**I do not know or not applicable**
An effective response to Haiyan would have needed more financial aid **before** the storm.	☐	☐	☐	☐	☐	☐	☐	☐
The effective response to Haiyan would have needed more financial aid **after** the storm.	☐	☐	☐	☐	☐	☐	☐	☐
The reconstructed buildings and materials used are more resilient to natural disasters.	☐	☐	☐	☐	☐	☐	☐	☐
Houses were re-built at less vulnerable spots.	☐	☐	☐	☐	☐	☐	☐	☐
The standards according to which houses were rebuilt are lower than before (referred to size or material)	☐	☐	☐	☐	☐	☐	☐	☐
Philippines will remain vulnerable to natural disasters.	☐	☐	☐	☐	☐	☐	☐	☐
Local communities were strengthened in their capacity to respond to the next disaster.	☐	☐	☐	☐	☐	☐	☐	☐
More reconstruction/recovery aid is needed to cope with future natural disasters.	☐	☐	☐	☐	☐	☐	☐	☐
Better preparation in terms of education, training and resilient constructions is **more important than foreign aid**.	☐	☐	☐	☐	☐	☐	☐	☐
The **reliance on external humanitarian aid is predominant** when coping with disaster loss.	☐	☐	☐	☐	☐	☐	☐	☐
People have successfully employed self-help strategies to cope with the disaster loss.	☐	☐	☐	☐	☐	☐	☐	☐

01.a [You can ask additional questions if points appear irregular/remarkable/different from other Barangays or if you consider anything as added value information:]

_____

_____

_____

_____

_____

_____

_____

02 Did you perceive the response in the aftermath of typhoon Haiyan as effective? What are the most significant reasons which explain **a rather ineffective** response to the crisis?

[Do not read the following suggestions; instead tick off the mentioned items:

- □ The strength of the storm
- □ weak governance structure/institutions
- □ long-time neglect of basic infrastructure
- □ chronic underinvestment in armed forces
- □ deficiencies in development and disaster management planning
- □ patronage politics
- □ government corruption and negligence
- □ poor enforcement of public safety
- □ poor enforcement of environmental legislations
- □ poor construction of buildings which is not resilient
- □ other, _____
- □ other, _____
- □ other, _____
- □ other, _____

□ **Response was perceived as effective**]
[If "effective" chosen:] Please explain why you think that the response was **effective**.

_____

_____

_____

[Please **choose** between **Q 03.a or Q 03.b** based on the situation in this Barangay**:**
- affected or
- not affected.

03.a [if affected by the storm]: How did the people in your barangay help each other after the typhoon hit the island?

03.b [if not affected by the storm]: How did the people in your barangay help other people **in affected areas** after the typhoon hit the island? How did they show solidarity in this Barangay?

_____

_____

_____

_____

_____

_____

04 How did you perceive solidarity and helpfulness among people in other affected Barangays?

_____

_____

05 We would kindly like to know how the typhoon affected your social relationships. How large is your **close personal social network in this Barangay**, i.e. relatives, close friends:

[If possible, **let him tick off those households** on the Barangay **household list**, to which he pursues a personal relationship, such as family and friends]

[If possible, **obtain a copy of the beneficiary list**]

[If no lists are available, ask:]

05.a How large is your **close** personal network in this Barangay? _____

05.b Were you able to actively support them? How many of those were able to receive aid after Haiyan? _____

[Proceed with **Q 08**, if Barangay was **not affected [Q02 pre-Q]** by the storm]

06 [if affected by the storm]: Did people from this barangay mainly tend to stay in shelters/evacuation sites or even in tent cities and bunkhouses until their homes were rebuilt or with host families/friends?

- □ Mainly in shelters/evacuation sites
- □ Mainly tent cities/bunkhouses
- □ Mainly with host families/friends
- □ **n/a** (provision of shelter was not necessary)

07 [if affected by the storm]: How many of the completely destructed houses due the typhoon are rebuilt/repaired (out of 10)?

_____ out of _____ [or: _____ out of 10]

08 Based on your **overall perception**, which kind of provided aid do you perceive as the most effective and which one as the one needed the most: **financial aid, relief assistance** or **manpower**? Please explain your choice. Differentiate between different stages of aid provision, if necessary.

[Most effective:] _____

_____

[Needed the most:] _____

_____

09 How were civil society organizations empowered in this Barangay?

What are the challenges of a more participatory process and if power is respectively shifted to the community?

_____

_____

_____

_____

_____

10 Do you believe you can contribute to an effective improvement in the Disaster Risk Reduction and Mitigation?

- □ Yes
- □ No

[If no:] What are the severe challenges?

_____

_____

_____

11 How many individuals/families decided to migrate from this Barangay to another since 2012? How many of these in the aftermath of the typhoon? **[Please, let him tick off all leaving/migrated individuals/families on the household list 2012:]**

- □ temporally: _____ thereof after Haiyan: _____
- □ permanently: _____ thereof after Haiyan: _____
- □ No migration
- □ I do not know

12 How many families migrated to this Barangay since 2012, if any? **[Please, let him tick off all incoming/migrated individuals/families on the household list 2016:]**

- □ temporally: _____
- □ permanently: _____
- □ No migration
- □ I do not know

Did you **receive** any individuals/families from affected areas in this Barangay in the aftermath of the typhoon?

- □ Yes. If yes, how many? _____
- □ No

13 Are you aware of any cases, where people moved in this area in the aftermath of natural disasters due to the availability of aid assistance?

- □ Yes
- □ No

14 Do people on Panay island still re-settle and live in vulnerable areas along the beach or move further inland as they should?

- □ tendency to move further inland
- □ tendency to re-settle along the beach
- □ other, specify _____
- □ no information available

15 Have people been pushed to coastal areas because there was no other place or because other places were not affordable before and/or after typhoon?

- □ Yes
- □ No

16 Were any no-build zones established, e.g. areas close to the beach, due to natural disasters? **[documents to be requested:]**

- □ Yes
- □ No

17 Based on your **overall perception**, please rank these relief efforts according to their importance in the aftermath of the typhoon?

__ community based self-help strategies

__ funds and relief aid provided by government

__ funds and relief aid provided by donor countries and international NGOs/agencies

Please explain why you chose this order.

_____

_____

_____

[h. CORRUPTION (25 min)]

In the last part we would like to talk about the issue of corruption. We are aware that this might be a very sensitive topic. However, we would kindly like to assure you that the information you will give us is strictly confidential and no one will bother you in any way about what you say concerning the questions we ask you. It will be impossible to trace these answers to a certain individual and your name will not be shown at any stage of the evaluation. Thus, we ask you to give honest response.

Furthermore, we would like to assure you that the following questions have no purpose to expose corruption among the Barangay Council nor do they implicate any involvement of your person in corruption.

We define corruption as an abuse of entrusted power for its private gain, financial mismanagement and fraud. Private gain might refer to persons but also to families, a village, groups of people and other actors, e.g. NGOs, aid agencies, private companies or any member of the village. Power can also be abused in many other ways, such as favouring family members, exploitation or giving aid to people that are not in need of it on purpose

[1st part on individual's perception]

01 Are there particular examples of corrupt abuse of relief assistance that you have become aware of in your professional experience? Please exemplify.

_____

_____

_____

_____

02 What do you feel are the **three greatest risks** of corruption in the humanitarian relief process? This can relate to particular sectors, stages in the project cycle or types of organisations. PLEASE TRY TO FORMULATE THE RISKS IN FEW WORDS ONLY.

1. _____
2. _____
3. _____

03 Have there been any known cases of misuse of power **among the Haiyan affected neighbouring** Barangay Councils and Municipal Councils? Please exemplify.

_____

_____

_____

04 [if applicable, i.e. **if relief assistance provided**:] Has anyone ever offered you a bribe payment with reference to the relief beneficiary selection and relief distribution and/or the reconstruction aid in the aftermath of the typhoon Haiyan?

- □ Yes
- □ No

[If yes:] **04.a** Who offered the payment?	Yes	No
representatives of a Local Government Unit	□	□
villagers in your community	□	□
a government agency	□	□
private firms	□	□
a NGO/international agency	□	□

[If yes:] **04.b** Did you report the person offering the bribe to the authority?

- □ Yes
- □ No

[If no:] **04.c** Why didn't you report it?

_____

_____

_____

05 Please rate the likelihood of each of the following incidents to happen **in this Barangay** referring to the typhoon Haiyan (on a scale from 1 to 7) and whether this is a situation which is perceived as corruption as well as whether you have come across such an incident in your personal experience?	Likelihood 1 to 7 Rank how likely this is to occur: 1 = never occurred 2 = very unlikely 3 = unlikely 4 = possible 5 = likely 6 = very likely 7 = occurred	I do not know or n/a	Do you perceive this as socially commonly accepted?		Personal Experience	
a Bringing gifts to a meeting with public officials/government agencies/NGOs		□	□ Yes	□ No	□ Yes	□ No
b Government officials, local authorities or NGOs demanding bribes for making relief payments or to facilitate and speed things up		□	□ Yes	□ No	□ Yes	□ No
c Neighbouring Barangays offered unofficial payments or gifts to different actors, such as businesses or NGOs involved in the reconstruction or relief provision to 'get things done'		□	□ Yes	□ No	□ Yes	□ No
d Requirement to make unofficial payments or gifts to different actors, such as businesses and NGOs involved in the reconstruction or relief provision to 'get things done' (in this Barangay)		□	□ Yes	□ No	□ Yes	□ No
e Additional payments made to Barangay Development Council to compensate for high efforts during the assistance period		□	□ Yes	□ No	□ Yes	□ No
f Anti-Corruption measures in humanitarian aid is a concept of the foreign organisations and slowed down the recovery and reconstruction in this Barangay		□	□ Yes	□ No	□ Yes	□ No
g The Barangay received less than it has been approved and allocated from higher government levels		□	□ Yes	□ No	□ Yes	□ No
h NGO or other organisations received funds/relief goods to provide humanitarian assistance in the Barangay but do not provide assistance (e.g. bogus NGO/organisation)		□	□ Yes	□ No	□ Yes	□ No
i With reference to the relief assistance, relatives/friends were hired based on social obligations or favours		□	□ Yes	□ No	□ Yes	□ No

06 Please give some examples to those questions you rated with “possible, likely and very likely”:

_____

_____

_____

_____

[2nd part based on facts]

07 How many alleged cases of corruption were reported in your Barangay?

- with reference to the delivered emergency aid (November and December 2013) _____
- with reference to the reconstruction (in 2014)? _____
- average per anno in the three years before the typhoon hit the island? _____
- these days (in 2016)? _____

[if **no corruption** was reported, please move on to **Q 12**]

[If any:] **07.a** What type of corruption and on which levels: [**protocols to be requested**]

[tick off potential types of corruption if applicable:

- □ bribery,
- □ misallocation of relief aid,
- □ misappropriated funds,
- □ repackaging

tick off levels:

- □ public sector,
- □ private sector,
- □ NGO,
- □ Individual level]

_____

_____

_____

_____

08 [if corruption was reported:] How many police investigations/prosecutions/convictions followed in this Barangay?

For the period	investigations:	prosecutions:	convictions:
November-December 2013			
2014			
2015			
2016			
Average per anno in the three years before the typhoon hit the island			

09 [if corruption was reported:] How was this tackled by the Barangay Development Council, government agencies and NGOs/international agencies?

[Development Council:] _____

_____

[Govt. Agency:] _____

_____

[NGO/international agency:] _____

_____

10 Did you personally need to deal with cases of corruption? How did you handle it?

_____

_____

11 [If he needed to deal with corruption:] What could have prevented corruption in the first place?

_____

_____

_____

[Continue here (**Q 12) if no corruption reported**]

12 Who was tasked with monitoring and controlling corruption in your Barangay in the aftermath of the typhoon Haiyan? [if Barangay was not affected, the question can still be generally answered]

- □ Community-level monitoring/civil society
- □ Barangay Captain/Disaster Council
- □ Local Government Unit, please specify

  _____
- □ National government
- □ Government agency [NDRRMC, COA, CHR and others], please specify

  _____
- □ Media
- □ No one tasked

13 Were there any proactive **measures** in place **to detect, assess and monitor bribery and corruption risks**? This can relate to the allocation and use of public funds or the selection and distribution of aid in your Barangay? [**documents to be requested, if any:**]

- □ Yes
- □ No

[If yes:] **13.a** Which particular measures to minimise corruption risks did you perceive as particularly successful? **[Please ask for the following examples in the end if not mentioned by interviewee: e.g. how often did audits take place and by which institution, what exactly was checked, how strong was media and civil society involvement, etc.**]

_____

_____

_____

_____

[3rd part on overall perception]

14 [applies to Q12 and Q13: who (institutions) and what (measures)] To what extent did those measures and/or institutions in charge successfully contain corruption? Please rate on scale from one to seven, where one means "Measures/institutions in charge failed to contain corruption, and there were no integrity mechanisms in place" and seven means "Measures/institutions in charge were successful in containing corruption, and all integrity mechanisms were in place and effective".

1	2	3	4	5	6	7	I do not know
□	□	□	□	□	□	□	□

15 Please comment why this was the case. [If he rated 7, **please let him also explain, why he does believe that this Barangay was more successful to tackle corruption than others**.]

_____

_____

_____

16 Please rate the following criterions based on your perception on scale from one to seven, where 1 means "very weak for three or more years" and 7 means "very strong for three or more years".

	1	2	3	4	5	6	7	I do not know
The accountability of the Mayor to oversight institutions and of local government employees for their performance	□	□	□	□	□	□	□	□
The access of Barangay villagers to information on public affairs	□	□	□	□	□	□	□	□
LGU capture by narrow vested interests	□	□	□	□	□	□	□	□

17 To what extent are public officeholders who abuse their positions prosecuted or penalized? Please rate on a scale from one to seven, where one means "Officeholders who break the law and engage in corruption can do so without fear of legal consequences or adverse publicity" and seven means "Officeholders who break the law and engage in corruption are prosecuted rigorously under established laws and always attract adverse publicity"

1	2	3	4	5	6	7	I do not know
□	□	□	□	□	□	□	□

18 The new president of the Philippines, Rodrigo Duterte, promised to fight crime and corruption. Do you believe he will be successful? What do you think about him?

_____

_____

_____

_____

19 Did you vote for him?

- □ Yes
- □ No
- □ Refused to answer

- Thank you -

A16 Invitation letters

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37035 Marburg
Germany

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Invitation to economic games

Dear Sir/ Madam,

My name is Lukas Kampenhuber and I am a researcher from the University of Marburg in Germany. Me, my collegues Tatjana and Trang, as well as assistants from [WIT], would like to conduct a study in 30 Barangays across Panay Island and Guimaras on behalf of the University of Marburg.

We would hereby kindly invite you to join us to play some economic games where you can earn some money as well. The games last about four hours. You will be able to earn between 50 and 400 pesos for your participation.

The game takes place in your Barangay on:

M M / D D / Y Y Y Y at 12:30 p.m.
At: _____

In the game you have to take decisions that will influence the earnings of yourself and others. Before and after the game we will ask you a couple of questions. Independent of what

happens during the games you will receive a minimum of 50 Pesos if you participate.

Your Household was randomly selected to take part in this games. Only the head of the household or the spouse are invited to participate. You will also be asked by our assistants to bring two persons along with you. **Those can be either friends or relatives that do not live in the same household with you or with each other**. The persons you bring along will have to participate in the same games as you and will also be able to earn between 50 and 400 pesos. One condition for your participation is that you bring those two additional people with you.

Since the game lasts four hours, we will serve drinks and some snacks.

The game is sponsored by the Robert Bosch Stiftung and there is no commercial interest in it. Personal information will be treated with confidentiality. We use these games and surveys to collect data for research purposes only and will not hand our information to third parties.

Thank you for your time and we are looking forward to see you for the games!

Lukas, Trang and Tatjana.

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Fax : (+49)-6421 2823780

Invitation to economic games

Dear Mr./Ms. _____ ,

My name is Lukas Kampenhuber and I am a researcher from the University of Marburg in Germany. Me, my collegues Tatjana and Trang, as well as assistants from [WIT], would like to conduct a study in 30 Barangays across Panay Island and Guimaras on behalf of the University of Marburg.

We would hereby kindly invite you to join us to play some economic games where you can earn some money as well. The games last about four hours. You will be able to earn between 50 and 400 pesos for your participation.

The game takes place in your Barangay on:

M M / D D / Y Y Y Y at 12:30 p.m.
At: _____

In the game you have to take decisions that will influence the earnings of yourself and others. Before and after the game we will ask you a couple of questions. Independent of what

happens during the games you will receive a minimum of 50 Pesos if you participate.

You might remember having played games like this before in August/September 2012. This time they will be very similar to those you have played before. Last time you came to us with
Mr/Ms _____ and
Mr/Ms _____ .
We will try to contact both of them so that the three of you come again. If one of those two persons is not available for any reason, we would like to ask you to invite another person instead. **This can be a friend or a relative that does not live in the same household as you**. One condition for your participation would be that you show up in a group of three people.

Since the session lasts four hours in total, we will serve drinks and some snacks.

The game is sponsored by the Robert Bosch Stiftung and there is no commercial interest in it. Personal information will be treated with confidentiality. We use these games and surveys to collect data for research purposes only and will not hand our information to third parties.

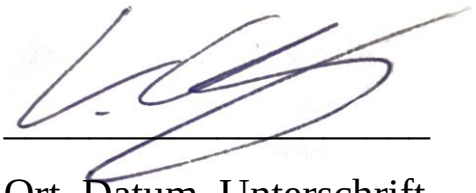
Thank you for your time and we are looking forward to see you for the games!

Lukas, Trang and Tatjana.

Eidesstattliche Erklärung nach §9 Abs. (1) b) Promotionsordnung des Fachbereichs Wirtschaftswissenschaften der Philipps-Universität Marburg vom 8. Juni 2009

Hiermit versichere ich an Eides statt, dass ich die vorgelegte Dissertation selbst und ohne fremde Hilfe verfasst habe, eventuelle Beiträge von Ko-Autoren dokumentiert habe, nicht andere als die in ihr angegebenen Quellen oder Hilfsmittel benutzt habe, alle vollständig oder sinngemäß übernommenen Zitate als solche gekennzeichnet habe sowie die Dissertation in der vorliegenden oder einer ähnlichen Form noch bei keiner anderen in- oder ausländischen Hochschule anlässlich eines Promotionsgesuchs oder zu anderen Prüfungszwecken eingereicht habe.

Innsbruck, 23.07.2019



Ort, Datum, Unterschrift